U. S . DEPARTMENT
OF AGRICULTURE
Soil Conservation Service

WIND EROSION AND SAND DUNE CONTROL

A SELECTED LIST OF REFERENCES

Compiled by
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Soil Conservation
Bibliography No. 1
June 1940

FOREWORD

This is a selected list of references, alphabetically arranged, issued during the period 1803-1939. Since Stuntz and Free, in their "Bibliography on Eolian Geology" appearing in Bulletin 68 of the United States Bureau of Soils, 1911, included so many citations to material on control of blowing soil, these have not been listed in the present bibliography. It is, therefore, suggested that for references to early writings from the period 1803-1911, the "Bibliography on Eolian Geology" be consulted and for later references the bibliography "Wind Erosion and Sand Dune Control".

In the latter are included a few citations prior to 1911 which were omitted by Stuntz and Free.

Most of the items are available in the Library of the United States Department of Agriculture. Book or library call numbers are, therefore, given at the end of the citations. Those without library call numbers may be obtained from the Library of Congress, unless otherwise indicated.

Numerical symbols in the index refer to item numbers.

We gratefully acknowledge the advice and assistance of Mr. R. L. Brown, Astoria Nursery Unit, Pullman, Washington, and Dr. C. J. Whitfield, Project Supervisor, Division of Research, Amarillo, Texas.

Mildred Benton, Librarian
Soil Conservation Service
U. S. Department of Agriculture

SOURCES CONSULTED

Card catalogues of the following libraries:

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Indexes:

Agricultural Index, 1916-August 1939
International Index to Periodicals, 1907-July 1939
Readers Guide to Periodical Literature, 1900-August 1939
U.S. Department of Agriculture. Division of Publications. Index to the publications of the United States Department of Agriculture, 1901-1935.
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WIND EROSION AND SAND DUNE CONTROL

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   Plants adapted to desert regions:pp.35-36.
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Three dune associations compared:New Jersey,Seven-mile island;Illinois,Beach(R.R.)station;Oregon,Seaside-Gearhart.

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Study of the morphology and biology of psammophytes for the purpose of choosing the fittest to bind the sands.
Summary in English.
"A study was made of plants growing in the sands of the Kara-Kum desert to determine their behavior under conditions of different degrees of exposure.Observations have shown that buried roots develop adventitious roots which reach zones where moisture is available.When the sand is blown away,new root sprouts arise from the exposed roots,again anchoring the plant to the sand.Experiments in artificial development of adventitious roots under different conditions of cover showed that adventitious roots occur only in the early spring and that a constant supply of moisture is essential to the development of such roots.Root sprouts have been found to occur under a layer of sand while sprouts of stems are never formed when the plants are covered by sand." -- L.J.Pessin. Abst. - Biol.Abst. Nov.1936,no.20360.

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"Soil-blowing control is incident to and bound up with the breaking up of the groundline sweep of the hard,driving winds

of the winter-spring period.
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"When we have readjusted our agricultural economy so that grazing lands will be utilized for that purpose alone,and productive farming lands for the farming enterprises to which they are adapted,and have adopted sound principles of conservation,we are certain to see a great diminution of dust storms, the elimination of much unnecessary impoverishment and the building of a self-sustaining agriculture."

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"A brief review of the work in sand binding conducted in

Gascony throughout the past century, together with more detailed information on the work conducted by the department of streams and forests since 1880, in which notes are given on the degree of success met with from the use of a large number of trees, shrubs, orchard fruits, economic plants, vegetables, and flowers.

The more important trees found to be perfectly adapted for this work include the stone pine, Lambert cypress, tamarack, and rosemary. The holm oak, black locust, box elder, Cedréla sinénsis, and mulberry have also proved fairly satisfactory. Among the food and forage crops the prickly comfrey, Irish potato, and certain vegetables have given the best results. Lucerne and the Jerusalem artichoke also do well." Abst. - Expt.Sta.Rec.19(11): 1045-1046. July 1908.

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Discusses vegetation used in controlling the dunes.

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The dunes of New Zealand.

Translated from the French by Rose Perenin, U.S.Forest Service, California Forest and Range Experiment Station.

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The growth of maritime pine on the dunes of Gascony.

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Wind erosion: ch.3, pp.23-31.

56. Call, L.E. Conditions in western Kansas. Land Today and To-Morrow 2(4):8-11, illus. Apr.1935. 1.96 Ad6L

Discusses wind erosion problem and suggests means of control.

57. Call, L.E. Cultural methods of controlling wind erosion. Amer. Soc.Agron.Jour.28(3):193-201. Mar.1936. 4 Am34P

1. "Keep the soil covered with growing vegetation or crop residue as much of the time as possible.

2. Avoid as far as possible working the soil when it is dry.

3. Take precautionary cultural measures to protect the soil

against wind erosion before it occurs and if blowing starts take prompt action to stop it.

4.Restrict cultivation for the control of wind erosion to the amount needed to obtain the necessary control.

5.Use implements for cultivation of a type that leave the surface soil rough and ridged rather than smooth and level.

6.Take advantage of any rain that falls to cultivate the soil in a manner to hold it from blowing until a growth of vegetation starts to protect the soil.

7.Re-establish permanent vegetation on areas of soil so sandy, so arid,or so impervious to water that the control of wind erosion is extremely difficult."

58. Call,L.E.and Salmon,S.C. Growing wheat in Kansas. Kans.Agr.Expt. Sta.Bul.219. 51pp. Manhattan, July 1918. 100 K13S Bul.219
Blowing of the soil:pp.40-41.
Ways to prevent soil blowing on wheat land in western Kansas.
1.Keep soil as rough and cloddy as possible consistent with a good seedbed.
2.On fields that tend to blow regardless of the preparation of the ground,a top dressing of straw will prevent blowing.
3.Cultivation at right angles to the direction of the wind.
4.Lister furrows run at intervals at right angles to the direction of the wind.

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60. Campaign to check erosion. African World 138(1785):57. Jan.23, 1937. 286.8 Af8
"Steady progress is being made by the Union Department of Agriculture and Forestry with its anti-soil erosion campaign. Launched in 1933,the campaign to check soil erosion has been adopted throughout the country,and the results attained are already considerable.
"During the present year the Government intends also to tackle the problem of drift sands.This is an evil which has assumed alarming dimensions in certain coastal areas,where drift sands have encroached on Government and privately owned property.A State scheme is to be instituted in terms of which facilities will be granted to landowners who are prepared to undertake the reclamation of drift sand areas on their properties."

61. Canada. Experimental farms. Report of proceedings under the Prairie farm rehabilitation act for the fiscal year ending March 31,1937. 50pp.,processed. 1938. 281.13 C164 1936/37
This report indicates work in progress to carry out the objectives of the act.It is stated that the value of drought resistance,soil-binding grasses for reclamation and soil-drifting control is being demonstrated.Tree planting as a drought and soil-drifting control measure is being promoted on a large

scale.Land utilization studies based on economic surveys,soil surveys and farm ownership investigations have been undertaken.

A major phase of the program is the development of surface waters resources for stock-watering purposes.

A large amount of research is in progress,including soil research,soil survey and land utilization investigations.

62. Canada. Experimental farms. Report of the work conducted under the Prairie farm rehabilitation act for the fiscal year 1935-36. 33pp.,processed. [1937?] 281.13 C164 1935/36

"The Prairie Farm Rehabilitation Act was passed by the Parliament of Canada in April,1935,'to provide for the rehabilitation of drought and soil drifting areas in the provinces of Manitoba,Saskatchewan and Alberta.'"

Measures introduced to secure the most economical utilization of soil moisture for crops,to prevent soil drifting and to reclaim abandoned farm land a re described in the report.

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(Extract des Ann.de l'Agr.Francoise tome XIII)

Sur les dunes,en général:pp.1-10.

Description des dunes de la Belgique:pp.10-12.

Description des dunes Batâves:pp.12-18.

Sur la possibilité de la fertilisation des dunes,Belges et Bataves:pp.18-21.

Sur les moyens de cette fertilisation:pp.21-27.

64. Carey,A.E.and Oliver,F.W. Tidal lands,a study of shore problems. 284pp.,illus. London, Blackie and son,ltd.,1918. 290 C18

Sand dunes:ch.5.

The fixation and plant protection of sand dunes:ch.6.

Shingle beaches and their fixation:ch.7.

Rabbit phenomena:ch.12,p.229.

65. Carlson,A.D. Dust blowing. Harper's Mag.171:149-158. July 1935.

Controlling wind erosion is a national problem.

66. Carter,John,jr. Crop production in northeastern New Mexico under severe soil-blowing conditions. N.Mex.Agr.Expt.Sta.Bul.243. 15pp.,illus. State College,1936. 100 N465 Bul.243.

Crops are divided into two groups(1)that in which a crop of grain or forage may reasonably be expected to be harvested;and (2)that in which only protection to the soil against wind erosion is expected.

67. Case,G.O. Coast erosion and protection on Long Island and New Jersey. Engin.News 74(8-10):348-351,388-391,438-442,illus. Aug.19,26,Sept.2,1915. 290.8 En34

Analysis of the causes of the littoral drift of sand along the coast,and of formation of sand spits and islands.Takes up in detail the causes of coast erosion and gives theory and behavior of sand dunes.Discusses coast protection work.

68. Case,G.O. Coast sand dunes,sand pits and sand wastes. 162pp., illus. London, St.Bride's press ltd.,1914. 99.47 C26
"This comprises a résumé of the work accomplished and the methods employed in various countries in the fixation of sand dunes and the reclamation of sand wastes,including many references to the literature on the subject." Abst. - Expt.Sta. Rec.30(3):239. Apr.3,1914.

69. Case,G.O. The use of vegetation for coast protection. Agr.Jour. Brit.Guiana 9(1):4-11,illus. Mar.1938. 9.6 B774
Describes formation of British Guiana coastlands.Classes vegetation into five main zones;four of these are below high water level.

70. Caufield,J.H. Dust storm serves notice. Farm and Ranch 53(18): 2-3,9,illus. Sept.15,1934. 6 T31
"An American Sahara is in the making,unless the windblown soil of eight or ten western States is again tied down with grass roots."

71. Ceichner,O. Plūstošo smilšu apmežošana Latvija. Mezsaimniecības rakstu krājums.8:20-44. 1930.
Afforestation of drifting sands in Latvia.
"Between 1835 and 1884 considerable areas were afforested by the Russians,mostly by direct sowing.Since 1922 the work has been resumed by the Latvian forest service,using 2-yr.-old Scotch pine after covering the sand with branches of pine,juniper and heather." Abst. - Biol.Abst. Oct.1931. no.24889.

72. Charles,F.E. Anchoring our shifting sands. Mich.Farmer 187(10): 327,354,illus. May 8,1937. 6 M58
Article discusses methods of controlling shifting sands at the Benton Harbor,Mich.,Soil conservation service project.

73. Charles,F.E. Modified practices for Michigan's fruit and truck country. Soil Conserv.5(4):93-94,96,99. Oct.1939. 1.6 So3S
"The three elements - wind,water,and sand - which in the beginning permitted fruit and truck crop production,have combined with the methods of farming to cause serious trouble to farmers through erosion.The winds blow the sands often creating sand storms that rival the dust storms of the plains country in intensity if not in extent."

74. Charles,Tudor. Western Kansas plans permanent curbs for wind erosion damage. Kans.Farmer 74(34):8,19. Apr.10,1937. 6 K13
"The theme of the(2-day)conference(of Kansas farmers at Dodge City),as expressed by every speaker,was that emergency measures of soil conservation soon would have to be abandoned in favor of plans which would permanently solve the wind erosion problem. Emergency measures can have no lasting benefit upon the agriculture of Western Kansas.
"Methods receiving most attention were moisture conservation by contouring,basin-listing,terracing and fallow;this to be

followed by establishment of vegetative cover on considerable areas of land.Listing Sudan grass or Black Amber cane and leaving it on the field,was favorably discussed."

75. Chase,Stuart. Disaster rides the Plains. Amer.Mag.124(3):46-47, 66-70,illus. Sept.1937.
How our great Western empire is being trampled to dust and what we can do to save it.

76. Chepil,W.S.and Milne,R.A. Comparative study of soil drifting in the field and in a wind tunnel. Sci.Agr.19(5):249-257. Jan.1939. 7 Sci2
"Since soil drifting was found to depend largely on the force of the wind and on the velocity gradient up to the height of about 18 inches or more,a wind tunnel of sufficient size can be accepted as a means of practically duplicating field conditions."

77. Chilcott,E.F. Preventing soil blowing on the southern Great Plains. U.S.Dept.Agr.Farmer's Bul.1771. 28pp. Washington, U.S.Govt. print.off.,1937. 1 Ag84F no.1771
"Soil blowing is often a serious problem in the southern Great Plains.The best preventive and control of soil blowing on cultivated land consists in keeping on the surface materials such as crops,crop residues,or clods,that resist soil movement."

78. Chile. Ministerio de industria y obras públicas.Sección de aguas y bosques. Las dunas de Cartajena i San Antonio,por Ernesto Maldonada. 18pp.,illus. Santiago de Chile,Impr.Cervantes, 1907.
The dunes of Cartajena and San Antonio.

79. Choun,H.F. Duststorms in the southwestern plains area. U.S. Monthly Weather Rev.64(6):195-203. June 1936. 1 W37M
Verifies the seriousness and severity of soil erosion due to wind,but also shows that total abandonment of the area is not imminent or necessary.Suggests selective tilling of some of the area and use of the remainder for grazing purposes.
A table gives data on duststorms at Amarillo,Tex.during 1933, 1934,1935 and 1936.

80. Clayton,E.S. Our prodigal new countries. Country Gent.107(9): 20,86-88,illus. Sept.1937. 6 C833
Cites destructive effect of wind blown sand in Australia and France.Concerning conditions in the latter country it is said that "along a stretch of coast line between Bordeaux and the Spanish border,there is no rock,nor even firm soil,to form a permanent foreshore and furnish protection against the ocean. Consequently sand was blown inland for miles.The area was formerly a wilderness covered with active sand dunes,which were constantly encroaching on adjoining fertile land.
"Fixation work was commenced by Colbert under Louis XIV of France and continued by Bremontier under Napoleon...It was not until the adoption of the idea of growing suitable leguminous shrubs to enrich the sand somewhat that pines could

gain a foothold...By means of barricades primary dunes were formed at a suitable distance from high-water mark.They then had to be stabilized at a satisfactory height to furnish protection for the country behind. Gourbet - Psamma arenaria - was the principal grass used for this purpose.

"Today a fine pine forest from five to ten kilometers wide stretches right along this dangerous portion of coast line."

81. Cleghorne,W.S.H. Veld reclamation:an example at Grootfontein. So.African Jour.Sci.29:185-191,illus. Oct.1932. 515 So84

Describes the anti-erosion work in the Aloe Valley by the Grootfontein school of agriculture.

82. Clough,A.J. Rough surface holds soil. Capper's Farmer 47(6):32, June 1936. 6 M693

Suggests tillage with implement that will throw up clods and leave furrows to catch moisture and force it into the ground. Tillage should be completed before windy season starts.(Adams County,Colorado)

83. Cobb,Collier. The Landes and dunes of Gascony. Elisha Mitchell Sci.Soc.Jour.26(3):82-92. Nov.1910. 500 E14

Historical description of the reclamation of this region.

84. Cole,J.S.and Morgan,G.W. Implements and methods of tillage to control soil blowing on the northern Great Plains. U.S.Dept. Agr.Farmers Bul.1797. 20pp.,illus. Washington, U.S.Govt. print.off.,Jan.1938. 1 Ag84F no.1797

Topics discussed are protective covers,including grain crops and plowless fallow;tillage implements,such as the plow,lister, disk,spike-tooth harrow,spring-tooth harrow,field or duckfoot cultivator,common row cultivator,one-way,furrow drill and rotary rod weeder;influence of the preceding crop,namely beans, corn and sorghum,potatoes,alfalfa and sweet-clover,strip cropping,regrassing and emergency control.

85. Coles,F.E. Dust-storms in Iraq. Gt.Brit.Met.Off.Prof.Note no.84. 14pp.,illus. London,H.M.Stat.off.,1938.

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"During the period June to September,dust-storms in Iraq occur with the 'shamal' or strong north-westerly wind;during the remainder of the year dust-storms may occur with winds from any quarter,but especially from directions from south-east through south-west to north-west."

86. Collins,Percy. Sand devastation;how the dunes advance and how their movement is checked. Sci.Amer.Suppl.83(2156):280-282, illus. Apr.28,1937. 470 Sci25

87. Combating sand drift in the Mallee.Effects of wind chute fences. Commonwealth Engin.23(7):217-218. Feb.1,1936.

Gives details of wind chute fence construction for the prevention of fine-particled sand accumulations in the railway cuttings,as used in the Mallee district of Victoria.Also

explains the inefficacy of planting methods in combating fine-grained sand drift.

88. Control and use of little waters in France.Excerpts from an address by M.Albert Magnein...before the Upstream engineering conference in Washington,D.C.,September 22,1936. Soil Conserv.2(6): 124-125,130. Dec.1936. 1.6 So35
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89. Cooper,W.S. The strand and dune flora of the Pacific coast of North America:a geographical study. In Essays in geobotany in honor of William Albert Setchell,ed.by T.H.Goodspeed,pp. 141-187. Berkeley,University of California press,1936. 452.9 Es7

90. Cooperative community action applied to wind-eroded county in Montana. U.S.Ext.Serv.Ext.Serv.Rev.9(9):133,illus. Sept. 1938. 1 Ex892Ex
Assisting the farmers in northeastern Valley county,Montana in putting a total of 15,800 acres under wind-erosion control were the county A.A.A.committee,Soil Conservation Service and the Montana Extension Service.

91. Corwin,E.P. Prevention of wind damage on sandy lands by the use of rye. Iowa State Hort.Soc.Rpt(1934)69:331-333. 81 Io9 69th,1934

92. Cowan,James. Farming practice in the sand hills section of Nebraska. Nebr.Agr.Expt.Sta.Bul.156. 67pp.,illus. Lincoln,1916. 100 N27 Bul.156
Prevention of soil blowing:p.32.

93. Cowles,H.C. The ecological relations of the vegetation on the sand dunes of Lake Michigan. Bot.Gaz.27(1,3-5):95-117,167-202,281-308,361-391. Jan.,Mar.,Apr.,May 1899. 450 B652
Bibliography:pp.388-391.

94. Cressey,G.B. The Indiana sand dunes and shore lines of the Lake Michigan basin. Geog.Soc.Chic.Bul.8. 80pp.,illus. Chicago, Ill.,The Society,1928. 331 C86 no.8
"This paper deals with those items which are of geographic or geologic interest and is largely a discussion of the principles of eolian activity and the evolution of the Indiana portion of Lake Michigan since the retreat of the last ice sheet." - Introduction.

95. Croucher,H.H.and Swabey,C. Soil erosion and conservation in Jamaica, 1937. Jamaica,Dept.Sci.&Agr.Bul.17. 20pp. Jamaica,1938. 8J227B n.s.no.17
"The problem of soil erosion in Jamaica is of particular interest and importance in that it concerns mainly the protection against erosion on steep hillsides many of which must be of necessity kept under cultivation...The main type of erosion... is sheet erosion...Wind erosion is not of primary importance, although on the rounded uplands of the Bull Head mountains,it aggravates sheet and gully washing of the soft conglomerates."

96. Cushioning the wind in New Mexico. U.S.Ext.Serv.,Ext.Serv.Rev.7(9): 133-134,illus. Sept.1936. 1 Ex892Ex
Explanation of how New Mexico is making progress in slowing up the movement of soil by the wind.

97. Cutting,C.D. Development of sand dune control,Warrenton,Oregon,area. ms. [Spokane,U.S.Soil conserv.serv.,193?
Copy in Soil Conservation Service Library,Spokane,Wash.

98. Cutting,C.D. Sand dune control at the mouth of the Columbia river. Shore and beach 6(4):119-121. Oct.1938.

99. Daniel,H.A.and Langham,W.N. Effect of wind erosion and cultivation on total nitrogen and organic matter content of soils in southern high plains. Amer.Soc.Agron.Jour.28(8):587-596. Aug.1936. 4 Am34P
"The total nitrogen and organic matter content was determined in cropped,virgin,and drifted soils of the southern high plains. The drift had an average of 24.5% less organic matter and 28.0% less nitrogen than the virgin soil.
"The data indicate that each time a soil is shifted more plant nutrients are removed,and that after being moved a large number of times,the dunes from soils that are dispersed by the wind finally become sand,regardless of the original texture."

100. Daniel,H.A. The physical changes in soils of the southern high plains due to cropping and wind erosion and the relation between the $\frac{\text{sand - silt}}{\text{clay}}$ ratios in these soils. Amer.Soc.Agron. Jour.28(7):570-580,illus. July 1936. 4 Am34P
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101. Daniel,H.A.,Langham,W.M.,and Foster,R.L. Some of the problems created by drifting soils. Southwest Soil and Water Conserv. Conf.Rpt.of Proc.(1937)8:51-57. 56.9 So82 8th,1937
Discusses plant nutrient losses,changes in the physical properties of the soil,amount of dust in the air,and living conditions.

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Fixation methods in India on the belt of sand which divides the Jodhpur-Bikaner railway from the bed of the river Luni.
A high thorn-fence was placed,immediately above the river bank and another a few yards from the railway so as to enclose the area,trespassing being forbidden.As soon as the fence on the river bank was covered with sand on the leeside,a fresh one was superimposed upon it;and this process repeated with the result that a ridge of loose sand is now formed and promises soon to attain such a height that future sand drifts instead of crossing it will be beaten back into the river bed and washed away.As the ridge becomes covered with wild vegetable growth and gains in firmness it will form a fairly effectual sand barrier.
Within the enclosed area it is hoped to fix the sand by means of grass and shrubs.

103. Davis,D.H. Droughts,dust storms and desolation. Minn.Acad.Sci. Proc.(1937)5:5-15. 500 M663 5th,1937.
"Any program for improving this condition the balance of nature in Great Plains area should involve:(1)Halting and reserving depletion:(2)checking erosion and rebuilding soil; (3)restoring depleted ranges;(4)placing the range under efficient management,either private or public.
"The reasons for failure of present attempts at land utilization are briefly as follows:
1.Use of land too often not adjusted to climatic conditions.
2.Land holdings are generally too small in this area of light and uncertain rainfall,with its additional hazards of hail and insect pests.
3.Taxes are too high..."

104. Davy,J.B. Stock ranges of northwestern California:notes on the grasses and forage plants and range conditions. U.S.Bur.Plant Indus.Bul.12. 81pp.,illus. Washington, Govt.print.off.,1902. 1P69B no.12.
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105. Diehl,O. Ueber die sandböden der Bergstrasse. Allg.Forst u.Jagd. Ztg.103(10):393-398. Oct.1927. 99.8 A13
On the sandy soil of the Bergstrasse.

106. Dieren,J.W.van. Organogene dunenbildung. Eine geomorphologische analyse der dünenlandschaft der West-Friesischen insel Terschelling mit pflanzensoziologischen methoden. 304pp., illus. 'S-Gravenhage,M.Nijhoff,1934. 463.8 D562
Proefschrift - Amsterdam.
Organic factors of dune building,a geomorphological analysis of the dune region of West-Frisian island Terschelling with plant sociological methods.

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From conservation des dunes:Plantations dans les dunes des Pays Bas,translated by E.P.Turner.
Discusses fixation of dunes by use of marram and by afforestation.The latter is capable of fixing the dunes in a permanent manner.

108. Disterdick,F.L. Severe sand storm in eastern Wyoming,January 18, 1933. U.S.Monthly Weather Rev.61(1):16-17. Jan.1933. 1 W37M

109. Dobkins,D.A.and Beck,V.S. Stabilizing the dust bowl. Soil Conserv. 3(6):157-158,167,illus. Dec.1937. 1.6 So3S

110. Dourthe,J.E.and Mason,D.T. The reforestation on French sand plains. Lumber World Rev.43(9):64-65,illus. Nov.10,1922. 99.81 L975
Letter from J.E.Dourthe to D.T.Mason giving information as to the economic means by which the bare sand plains of southwest France were converted into valuable forests.

111. Drăcea,M. La culture du robinier dans les terrains sablonneaux de l'Oltenie. Cong.Internatl.d'Agr.Bucharet.Actes(1929) 14th,v.4:541-545. 29 C7614A 14th,1929
Beginning in 1853,and particularly since 1880,large areas of shifting sands in southern Oltenia(Rumania)have been planted with black locust(Robinia pseudoacacia).Not only was this effective in fixing the sands,but it has also proved to be very profitable. Abst. - Biol.Abst. Mar.1934, no.6698.

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"Disastrous wind erosion in the future may be prevented throughout the Great Plains when(1)proper land use is practiced;(2)proper and timely tillage is practiced for the recommended crops in the area;and(3)effective temporary control measures are used where conditions indicate soil blowing is likely to occur."

113. Drake,R.R. Wind erosion can be controlled by proper tillage operations. U.S.Dept.Agr.Yearbook 1935:342-344,illus. 1936. 1 Ag84Y 1935
"The best method of checking soil blowing is by roughening the surface in strips at right angles to the prevailing winds. A cultivator or spring-tooth harrow may be used for this purpose.A lister is preferable in light sand or loose,dry loam soils."

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"Forest plantations have stopped shifting of soils in trials made by state colleges."

115. Drift sand reclamation in Australia.Fixing the Goolwa sands with Marram grass. Agr.Jour.Cape of Good Hope 25(6):679-685. Dec.1,1904. 24 Ag8
Marram grass was planted to arrest sanddrifts which were ruining grazing land by the sea.The grass grew prolifically, stopped the drift,and pioneered the way to the successful growth of other grasses.

116. Drift-sands and their formation. Pop.Sci.Monthly 33(4):534-542. Aug.1888. 470 P81
Translated from "Das Ausland".
Discussion of the sand-tracts of Europe.

117. Drummond,W.S. Dust bowl:short grass country - where dry years and high winds speed the errant soil,and only nature can bring relief to stouthearted Dust Bowl farmers. Rev.of Reviews (New York)93(6):37-40,illus. June 1936. 110 Am32
Describes the dust bowl before and after the soil was weakened by overgrazing and overproduction,and discusses control projects.

118. Dubianskii, V.A. Sand desert in Southeastern Karakum, its natural regions, the possibility of its agricultural utilization, and its importance for irrigation. Trudy Prikl.Bot., Genet., i Selek. (Bul.Appl.Bot., Genet., and Plant Breeding) 19(4):3-285. 1928. 451 R92
Summary in English.
"This investigation was conducted by the Russian Geogr.Soc. 1912-1918, in Turkestan near Rebetek. In 1925 the work was resumed by the Inst. of Applied Bot. Southeast Karakum with an area of 57,000-57,500 sq.km. may be divided into 5 geographic regions: (1) the Barkan Range composed of migrating sand dunes covering 8,500-9,000 sq.km; (2) sand hills, 9,000 sq.km. in area, supporting a vegetation of sand tolerant shrubs and herbs, and forests of Arthrophytum haloxylon; (3) sandy clay plains of 10,000 sq.km. comprising about 1/4 of the desert, and bearing a vegetation of desert herbs and shrubs; (4) sandy ridges (14,500-15,000 sq.km.) which with the broad valleys between are covered with grasses and other herbs that provide excellent forage for sheep; (5) the foot hills of Hindu-Kush covering 14,500 sq.km. in the southern part near the Afghan border. The dunes are the most primitive and evolve the most rapidly; as soon as the sands become vegetation bound, they cease to shift and become stationary sand hills or ridges. They, the dunes, not only submerge the cultivated land and fill the irrigation ditches, but even engulf entire villages. The desert is suited for the grazing of sheep and camels. The forests furnish the sole supply of wood. In order to check the migration of the dunes, to conserve the forage and fuel now existing, and to improve the supply, prohibition of the cutting of shrubs on dunes and the transitional sands within 3 km. of the cultivated lands; the divergence of waste irrigation water into the area bordering the Amu-Daria valley; the planting on this strip of rapidly growing and sand tolerating trees, such as Morus, Populus, and Tamarix; and the regulation of the cutting of living trees of the forests are recommended. - Freda Detmers. Abst. - Biol.Abst.Apr.1930. no.10894.

119. Duley, F.L. Wind erosion in the Great Plains. Land Today and Tomorrow 2(4):5-8, illus. Apr.1935. 1.96 Ad6L
Wind erosion can be controlled only by radical changes in cropping methods.

120. Duncan, Kunigunde. Reclaiming the dust bowl. Nation 149(11): 269-271. Sept.9,1939. 111 N
Praises the work of H.H.Finnell and Bert W.McGinnis.

121. The dunes and lands of Gascony. Forester 3(7):88-90. July 1, 1897. 99.8 F762

122. Les dunes et les landes of Gascogne. Canad.Forestry Jour.8(6): 149-151. Nov./Dec.1912. 99.8 C16

123. Dust and flood: man-made disasters. Lit.Digest 121(14):32, illus. Apr.4,1936. 110 L
Comments on statements made by Paul B.Sears.

124. The dust bowl area. Science n.s. 84(2170):113-114. July 1936. 470 Sci2
Contains preliminary announcement of erosion survey undertaken in the southern plains region.States that "the results of this survey indicate clearly...that the Southern Plains is not yet a desert by any means and that the opportunity for agriculture there is far from ended.Nevertheless,the Southern Plains farmer must quickly adapt himself to natural conditions,if wind erosion is not to spread throughout most of the region.Conservation farming,involving precautionary crop planning,contour tillage and other measures of soil and moisture conservation must be adopted."

125. "Dust-bowl" into grazing-land.Gusts of blinding top-soil focus Washington's eyes on problems of saving America's "Bread-basket" from desert. Lit.Digest 121(10):9,illus. Mar.7,1936. 110 L

126. Dust bowls of the empire. Round Table 114:338-351. Mar.1939. 280.8 R76
I.How soil erosion happens.II.Soil erosion in the empire. III.The problem in Africa.IV.Wider issues.

127. du Toit,R. Protecting the pasture against wind-blown sea-sand. Farming in So.Africa 9(103):403-404,illus. Oct.1934. 24 So842
Farmers along the T'Zitzekamma coast in the Humansdorf district,South Africa are urged to apply the following practices in order to prevent encroachment of sea-blown sand:(1) planting of trees(2)erecting catchment fences(3)bushing(4) establishing sand-binding grasses.

128. Dwyer,E.B. Notes on the reclamation of drift sands. So.African Jour.Sci.25:168-180. Dec.1928. 515 So84
Discusses coastal sands and their control;inland drift sands and their control.

129. Easterday,A.M. Weed terraces. Soil Conserv.3(2):45-46,illus. Aug.1937. 1.6 So3S
At the Mansker demonstration project near Clayton,N.Mex., tumble weeds have been used as the binding medium in their formation of weed terraces to prevent wind erosion.There terraces must be stabilized by fibrous-rooted vegetative cover. These weed terraces serve as catchments for soil drift,act as barriers to run-off from rainfall and reduce wind velocities near the ground to permit plant seeds to lodge and grow.

130. Edwards,A.D. The sociology of drought. Rural Sociol.4(2):190-202,figrs.,tables. June 1939. 281.28 R88
"This study of a drought area county in the Southern Great Plains attempts to analyze the effects of recurrent drought on population,systems of farming,standard of living community organization,public relief and assistance,and attitudes and opinions.A striking similarity of the effects of drought upon community life is apparent in a comparison of several drought

periods.The general pattern of social changes during drought is summarized.An outstanding feature of the recent drought of 1932-36 has been the large amount of federal assistance which has been served to stabilize the farming economy.Recommendations to avert the most disastrous effects of future droughts do not involve a complete shift from wheat growing but rather a better adaptation of this type of farming to the climate of the Great Plains along with increased diversification and greater emphasis on measures designed to control soil blowing."

131. Ellis,J.H. Soil drifting in Manitoba. West.Canad.Soc.Agron.Proc. 1920:38-48. 1921. 7 W522 192
Discusses areas affected,the causes,the damage,and methods of relief.

132. Emergency program aids wind-eroded states. U.S.Ext.Serv., Ext.Serv. Rev.7(8):118. Aug.1936. 1 Ex892Ex
Funds for an emergency program were made available to the southern Great Plains area by an act of Congress approved February 29,1936 and the campaign was started early in March. The States of Colorado,Kansas,New Mexico,Oklahoma and Texas are cooperating in this work which calls for the listing of 8,252,585 acres of land subject to wind erosion.

133. Emerson,F.V. Agricultural geology. Ed.2. 377pp.,illus. New York, J.Wiley & sons,inc.,1928. 400 Em3 Ed.2
Wind work and eolian soils:ch.5,pp.130-143.

134. Engineering aspects of present midwest drought. Engin.News-Rec. 112(26):834-835. June 28,1934. 290.8 En34
Precipitation of 50 per cent normal from January to May over twelve states sets new low-flow record for rivers,depletes ground-water supplies and threatens public water supplies for late summer.Drifting sand causes highway problems.

135. Engler,A. Forstlicher reiseskizzen aus den dünen und landes des Gascogne. Schweiz.Ztschr.f.Forstw.53(5-7):129-140,157-164, 189-200. May,June,July 1902. 99.8 Sch9
Forestry travel sketches of the dunes and landes of Gascony.

136. Fabre,L.A. Mémoire sur les plateaux des Hautes-Pyrénées et les dunes de Gascogne. 14pp. Paris,1901. 331.F11M
Monograph on the plateaus of Hautes-Pyrenees and the dunes of Gascony.

137. Fairfield,W.H. Soil drifting in Alberta. West.Canad.Soc.Agron. Proc.1920:35-37. 1921. 7 W522 1920
Proposed methods of control:plowing only when the soil is in proper condition as to moisture;greater consideration as to the implements used to destroy vegetation;the importance of producing a lumpy condition on the surface of an overworked summerfallow;and,the general use of winter rye.

138. Farmers relate soil blowing experiences. Mont.Farmer 21(23):3. Aug.1,1934. 6 M764

139. Finnell,H.H. Control of wind erosion on the southern high plains. Land Today and Tomorrow 2(3):4-6,illus. Mar.1935. 1.96 Ad6L

140. Finnell,H.H. Prevention and control of wind erosion of high plains soils in the Panhandle area. 22pp.,mimeogr. Washington,D.C.,1935. 1.96 Op2P
"The control methods representing successive lines of defense against wind erosion are enumerated in the order of their related importance:
1.Utilization of erosion resisting residues.
2.Moisture conservation for maintenance of vegetation.
3.Emergency cover crops.
4.Windbreak tree plantings.
5.Emergency tillage operations."

141. Finnell,H.H. The progress made in wind erosion control in the southern high plains region. Southwest Soil and Water Conserv. Conf.Rpt.of Proc.(1936)7:9-11. 56.9 So82 7th,1936

142. Finnell,H.H. Research contributions to wind erosion control. Soil Conserv.3(10):255-257,illus. Apr.1938. 1.6 So3S

143. Finnell,H.H. Results of conservation practices in the southern wind erosion region. Southwest Soil and Water Conserv.Conf. Rpt.of Proc.(1937)8:49-51. 56.9 So82 8th,1937

144. Finnell,H.H. When the soil blows. Farmer-Stockman 48(5):109, illus. Mar.1,1935. 6 Ok45
"Control calls for no over grazing,saving of stubble,tillage methods,cover crops,moisture conservation."

145. Finnell,H.H. Wind erosion control and its effect on a planned agriculture. Southwest Soil and Water Conserv.Conf.Rpt.of Proc.(1935)6:51-54. 56.9 So82 6th,1935.
"...Since continuous successful cropping with proper use of the crop residue is the best protection against both wind erosion and fertility decline,the plains farmer is not being called on to make sacrifices for posterity.In the so-called dust bowl,he best serves posterity,who best serves himself.
"Productive farming is the answer to wind erosion."

146. Fitch,C.L. Prevention by trees of wind erosion of peat,muck,and silt vegetable lands. Iowa State Hort.Soc.Proc.(1936)70: 344-347. 81 Io9 70th,1936
American elms are recommended.
Mentions extension project for the windbreaking of 100 acres in Iowa in 1937 and includes memorandum of agreement.

147. Fitch,C.L. What the wind did last spring and what the wind may do to the lake bed vegetable business. Iowa State Hort.Soc. Rpt.(1934)69:315-322,illus. 81 Io9 69th,1934
Discusses what the wind did to peat,muck and silt soils which are used for vegetable growing in Iowa and southern Minnesota.

148. Fitzgerald,O.A. This Idahoan does right by his soil. West.Farm Life 40(2):3,illus. Jan.15,1938.
Finding that his soil needed humus to give it body to prevent blowing,a Shelley,Idaho farmer began to use "strawy manure" in 1929 and by now has just about completed "popping up" his 190 acres.He has found that his manure program has had a direct effect on potato quality as well as yields.The manure adds fertility and humus and also builds the water-holding capacity of the soil.

149. Five inch rain couldn't get away. Kans.Farmer 74(32):29. Mar. 13,1937. 6K13
A Greeley county,Kansas,farmer reports successful experience with contoured land.With the 'five shovel' or more commonly known 'Peacock machine',he seeded 450 acres of wheat on the contour and found this wheat to be the best of his crop.
Besides conserving moisture he believes that contouring has solved his wind erosion problem for his land showed no tendency to shift throughout the summer and fall.

150. Fixing drift sand. Jarrah 1(6):14-16. Aug.1920. 99.8 J29

151. Flax barriers to check drifting sand. Sci.Amer.131(4):255,illus. Oct.1924. 470 Sci25
Preventing the barren sand wastes of New Zealand from encroaching upon good land.

152. Flood,F.A. The dust bowl is being tamed. Farmer-Stockman 50: 405,425,illus. July 1,1937. 6 Ok45
Co-operative efforts will control wind erosion is the opinion expressed.This view is based on statements made by H.H.Finnell of the Soil Conservation Service.

153. Florell,V.H. Native grasslands in the Huron(South Dakota)area. Amer.Soc.Agron.Jour.29(5):405-411,illus. May 1937. 4 Am34P
"The Woolsey and Shue Creek Soil Conservation Demonstration areas near Huron were utilized for the study...to determine the approximate amount and distribution of native sod in this section of South Dakota,the condition of present grass stands, and to get additional information on the distribution of the predominating grasses and w eed plants..."
"Little or no wind erosion has occurred where the stands of native grass are in good condition."

154. Fluyt,P.C.M. Herbebosscḥing met dennen ter oostkust van Sumatra. Tectona 28(9):633-705,map. Sept.1935. 99.8 B65
Reafforestation with pine on the east-coast of Sumatra. Summary in English.

155. Fly,C.L. A preliminary report of the chemical and mechanical analysis of dust deposited by wind at Goodwell,Oklahoma. Okla.Panhandle Agr.Expt.Sta.Panhandle Bul.57. pp.11-15. Goodwell,1935. 100 Ok42 Bul.57

156. Fodor,Gyula. Erdösitès az Alföld homoklerületein a talajjellegzö növenyzet,talajszel-vényvizsgálatok es a talajviz nivováltozásainak a figyelembevételével. Erdészeti Lapok 75(7-8,11):581-596,692-709,953-975. 1936. 99.9 En2
Sand afforestation on the Hungarian Great Plains respecting the soil flora,the testing of soil profiles and the alterations of the soil water surfaces.
Summaries in German,French and English.

157. Forests and sand drifts. Austral.Forestry Jour.3(3):73-74. Mar. 1920. 99.8 Au7
The inland sand drifts of Australia.

158. Free,E.E.and Westgate,J.M. The control of blowing soils. U.S. Dept.Agr.Farmers' Bul.421. 23pp.,illus. Washington, U.S. Govt.print.off.,1910. 1 Ag84F no.421
"The effect of wind in blowing soils is in the aggregate of much importance in the humid sections,although the process is slower and less obvious than in drier regions.The good effect of the shifting of soil lies in the mixing of the soil particles and the renewing of the surface layers.The most practical means of control lie in the proper adjustment of the cropping and tillage system so as to provide at the critical stages a protection of either plants or rough surface soil.Increasing the humus content of the soil also reduces the danger of blowing.When the land is used for intensive farming,brush lines, straw covering,hedges,or wind-breaks of trees constitute the most efficient protection."

159. Fuller,G.D. The plant communities of the dunes. Sci.Monthly 38(6):444-451,illus. June 1934. 470 Sci23
Divides dune complex into(1)lake shore,(2)young dunes along lakes,(3)pine associations,(4)the older dunes,(5)black oak associations,(6)red and white oak association,(7)the climax forest - maple,beech,hemlock.Discusses these plant communities as they appear on shore of Lake Michigan.

160. Garren,G.M. Overcropping with peanuts or treatment of "blowing soils". Tex.Agr.Expt.Sta.Bul.40. 7pp. College Station, 1917. 100 T31S Bul.40

161. Gautier,E.F. Sahara,the great desert. 264pp.,illus. New York, Columbia university press,1935. 127 G23S
Eolian erosion:the desert landscape:ch.5,pp.41-52.

162. Gifford,John. The fixation of shifting sands. Forestry and Irrig.9(1):39-44,illus. Jan.1903. 99.8 F762

163. Gifford,John. Forestry on sandy soils. N.Y.Comn.Fisheries,Game and Forests Ann.Rpt.(1894)4:396-417,illus. 412.9 N48P 4th,1894

164. Gilkeson,R.H. Stop soil blowing. Kan.Farmer 72(21):3,17,illus. Nov.10,1934. 6 K13
Farming land to prevent blowing is the important thing,but if blowing gets started,farm to control it.

165. Gorrie,Archibald. Remarks on the planting of the sandhills on the sea-coast at Holkham,Norfolk. Roy.Scot.Arbor.Soc.Trans. 13:350-352. 1891-1893. 99.9 R81T

166. Gorrie,R.M. Protection forests as a means of preventing desiccation. Indian Forester 41(12):770-776. Dec.1935. 99.8 In2
Discusses the West African and the American Middle West problems.

167. Goudie,H.A. Sand-dune reclamation. New Zeal.Dept.Agr.Jour.23(6): 340-343. Dec.20,1921. 23 N48J
Activities of the New Zealand state forest service in controlling drifting coastal sand dunes.

168. Grasovsky,A.J. Forestry in Palestine.Restoring ancient woodlands to safeguard country's future. Palestine and Middle East Econ. Mag.10(10):418-420,illus. Oct./Nov.1938. 286.8 P172
The system of control practised in the Forest Reserves of the hill districts of Palestine aims chiefly at arresting erosion, conserving surface water,and as far as possible satisfying the local demand for forest produce and fodder for grazing.The Department of Forests is also concerned with the fixation of sand dunes.

169. The grasslands...,which are the key to life on the 2,000,000,000 acres of this continent.Why the dust storms of last spring are warnings that man abused his planet past its powers of resistance and why government,science and the common citizen must now unite to save it. Fortune 12(5):58-67,190,198,200, 203. Nov.1935.

170. Greeley,W.B. The forest policy of France. The control of sand dunes and mountain torrents. Amer.Forestry 26(313):3-7,illus. Jan.1920. 99.8 F762
Material for this article has been taken largely from "Cours de Droit Foresteir" by Charles Gugot and from data prepared by G.Garbe,Engineer des Ponts et Chausses.

171. Greenfield,George. New Yorker is awed and shocked in the fog of a dust bowl storm.Rides 200 miles on train through a blinding murk that chokes and kills all animal and plant life,and denudes and ravages a once rich land. U.S.Off.Indian Aff. Indians at Work 4(17):8-13,illus. Apr.15,1937. 156.5 In23

172. Greenfield,W.P. The sand dunes of the Lincolnshire coast. Quart. Jour.Forestry 14(3):176-184. July 1920. 99.8 Q2
Suggestions for utilization of waste land caused by sand dunes.

173. Griffiths,R.L. Wind erosion of soils in the agricultural areas. So.Austral.Dept.Agr.Jour.40(1):25-40,illus. Aug.1936. 23 So84
References,p.40.
Discusses experience of other countries with erosion,causes of erosion,means of control,importance of rotation cropping to check soil erosion,control of wandering sand dunes with sand binding grasses,growing trees for wind breaks,importance of controlled grazing and cultivation practices to control erosion in South Australia.

174. Guild,E.R. Land whoa! The migration of Cape Henry. Mil.Engin. 30(170):81-85,illus. Mar./Apr.1938. 290.9 Un3
This article is mainly concerned with a means of keeping the sand on the foreshore by stopping wind erosion.This means was successfully developed in 1931 in the form of a "brush groin" which used the power of the wind to build a "groin dune" athwart the beach.
Pictures illustrate progressive steps in the building of a foredune.

175. Gunderson,O.S. My experience with soil blowing. Mont.Farmer 22(10):3. Jan.15,1935. 6 M764
A good,short heavy crop of oats prevented fallow ground from blowing.

176. Gustafson,A.F. Conservation of the soil. 312pp.,illus. New York,McGraw-Hill book company,inc.,1937. 56.7 G97
Erosion by wind:ch.2,pp.20-23.
Results of wind erosion:ch.3,pp.41-45.
Control of wind erosion:ch.14,pp.244-262.

177. Hadley,J.N.and Rogers,David. Wind erosion damage checked in Navajo land. Soil Conserv.5(2):42-43. Aug.1939. 1 So3S

178. Hafenrichter,A.L.and Wanser,H.M. Wind erosion on the summer-fallowed wheatlands of the west. Soil Conserv.1(2):8-10,illus. Sept. 1935. 1.6 So3S
"Prevention of wind erosion is a national necessity but control is not certain unless stringent methods are used.Any control other than that inherent in the soil is questionable as a permanent measure."

179. Hagelin,Vernon. Farms that blow away.Vegetation reclaims drifting sand. Prairie Farmer 108(9):4,30. Apr.25,1936. 6 P883B
Describes the little deserts of northwestern Illinois,and states that,with soil conservation methods and financial aid, farmers are planting soil-binding plants and trees to reclaim them.

180. Hansen,Roy. Soil drifting in Saskatchewan. West.Canad.Soc.Agron. Proc.1920:49-59. 1921. 7 W522 1920
To control soil blowing "We have sufficient experience to know the proper implements to use,and we have definite information

on proper methods of cultivation so that our present needs are not for new crops,nor new implements,nor new methods of culture,but rather the co-ordination and putting into practice of our present knowledge,the systematizing of our agriculture,not only in the province as a whole but on each individual farm.This could be boiled down into two words, 'systematic rotations'."

181. Hardy,A.D. Sand drift in the Mallee. Gum Tree 11(51):5-7,10, 12,29,illus. Sept.1929. 99.8 G95
Due to indiscriminate removal of cover for cultivation of many thousands of acres,the sandy soil,exposed to strong winds,drifted and formed sand hills.

182. Hardy,E.A. Use of tillage machinery in soil-drifting areas. Sci.Agr.16(5):281-284,illus. Jan.1936. 7 Sci2
Discusses the drag harrow,the spring tooth harrow,the disc harrow,the one way disc,the one way disc seeder,the single disc or double disc drills,the hoe drill,the stiff tooth cultivator,the furrow drill,the seeder plow,the rod weeder, and the moldboard and disc plows.

183. Harebo,Ivar. How we stopped soilblowing. Mont.Farmer 21(13):3. Mar.1,1934. 6 M764
Discusses how soilblowing was controlled on a Montana dry farm by strip farming.

184. Harlé,Edouard. The fixation of the dunes of Gascony. 35pp., illus. Wellington,N.Z.Govt.Printer,1920. 99.47 H222
"Extract from the Bulletin de la Section de Geographie 1914."
Translated from the French by R.M.D.McIntyre and E.P.Turner.
Describes operations carried out during the first half of the nineteenth century in reclaiming the sand dunes bordering the Bay of Biscay.

185. Harlé,Edouard et Harlé,Jacques. Mémoire sur les dunes de Gascogne avec observations sur la formation des dunes. 145pp. Paris, Imprimerie nationale,1920.
Liste des ouvrages cités:pp.138-143.
Extrait du Bulletin de la Section de Geographie,1919.
Monograph on the dunes of Gascony with observations on the formation of dunes.

186. Harmer,P.M. Prevention of wind injury to crops on muck land. Mich.Agr.Expt.Sta.Cir.Bul.103. 8pp.,illus. East Lansing, Mar.1927. 100 M58S Cir.Bul.103.
"Protection from wind injury to muck crops is greatly needed in a majority of the muck areas of the state.
"Of the four methods of protecting the crops,maintenance of the moisture supply,compaction of the soil by heavy rolling, addition of organic matter and use of windbreaks,all should be employed in a good system of muck farming.
"Every forty acres of muck should be protected by a windbreak of trees on the west and south sides."

187. Harper,F.B. Wide-row plantings of annuals. Soil Conserv.3(6): 163-164,illus. Dec.1937. 1.6 So3S
As a protection against soil blowing in the Park River area of North Dakota crop systems called for from 2 to 4 rows of corn in potato fields,or some combination of corn and cane,Sudan grass,or tame sunflowers,between strips of land being summer fallowed,either on the contour or crosswise to the prevailing wind.
The annual plantings serve three major purposes:(1)They deflect the wind upwards and thus shield adjacent soil from blowing;(2)they increase winter moisture retention by holding snow that otherwise would be blown away;(3)they provide wildlife food and cover.

188. Harvey,L.H. A coniferous sand dune in Cape Breton Island. Got.Gaz.67(5):417-426,illus. May 1919. 450 B652
"It is the purpose of this paper to put on record several facts of ecological interest:(1)a coniferous and dune with Picea canadensis as its facies located at the latitude of 47 north;(2)Poa compressa as a sand binder;(3)abundant layering in Picea canadensis and Abies balsamea;(4)the anamalous condition of a sand dune moving seaward;(5)a phenomenal development of Arceuthobium pusillum on Picea canadensis; (6)the decisive value of ecological data in the interpretation of physiographic phenomena."

189. Harwood,E.H. The maritime pine forests of Gascony. Gard.Chron. (ser.3)68(1770):264-265,illus. Nov.27,1920. 80 G162
Gives account of forests,also reviews history of operations which led to the afforestation of an area of some 800,000 acres which "little more than a century ago was a wilderness of shifting sand and swamps".

190. Holm,H.J.and Quate,G.S. Report on the wind erosion and dust menace,Grantsville,Tooele county,Utah. Apr.6,1935.
Copy in Soil Conservation Service Library,Albuquerque, N.Mex.

191. Henderson,C.A. Letters from the dust bowl. Atlantic Monthly 157(5):540-541. May 1936. 110 At
"For twenty-eight years Mrs.Caroline A.Henderson and her husband have been farming in Oklahoma.For the past five years her household has been one of many that have fought as best they might the devastating effects,first of the unprecedented drouth,and then of the resulting dust storms.Her letters, written to a friend in Maryland,open a vivid and pathetic chapter of American agriculture." - The Editors.

192. Henderson,C.A. Spring in the dust bowl. Atlantic Monthly 159(6): 715-717. June 1937. 110 At

193. Herbert,P.A. Sand blow planting. Mich.Agr.Expt.Sta.Quart.Bul. 5(4):198-199. East Lansing,May 1923. 100 M58S
Of various species planted in an effort to prevent drifting

sand from filling an important drainage ditch,willows and poplars grown from cuttings planted 1 ft. apart in single or double rows were most effective.Some of the original root collars are now buried 6 ft. in the sand.It is suggested that in order to permanently stop the drifting sand it is necessary to plant poplars and willows at its source,following later with longer lived species such as spruce and pine. Abst. - Expt. Sta.Rec.49(5):439-440. Oct.1923.

194. Hesselink,E.,en Hudig,J. De invloed van eene bodembedekking bij stuifzand of den groei der dennen. Rijksboschbouwproefsta. Wageningen.Meded.3(3):315-354. 1928. 99.9 W12
Influence of soil covering of windblown sand on the growth of Pinus silvestres.
Summary in English.
"Covering the soil,apart from the fixation of the fine sand and temporary manuring,is noxious rather than advantageous." Abst. - Biol.Abst. Jan.1930, no.1931.

195. Hibbs,Ben. Dust bowl. Country Gent.106(3):5-6,83-87,illus. Mar.1936. 6 C833
The author stresses the fact that "wind erosion has become a problem of national consequence".

196. Hibbs,Ben. The dust bowl can be saved. Sat.Evening Post 210 (25):16-17,77-78,80-82,illus. Dec.18,1937.
Tells of progress in reclamation of the dust bowl area due to scientific methods of wind erosion control.The program of improved farming which is being urged for that area is predicated upon three basic points:(1)conservation of moisture, (2)the consistent use of cover crops,and (3)a cessation of the disastrous practice of planting wheat in a dry seed bed.
Mention is made of the work of C.J.Whitfield in dune control and that of H.H.Finnell in contour terracing.
In connection with "the excitement about irrigating the dust bowl from deep wells" the author contends that "while a modest amount of irrigation is a hope that cannot be dismissed, water can never touch a large enough portion of the blow lands to cure wind erosion".The problem,as he sees it,is one of getting sufficient cooperation and participation to end the dust storms.The "human angle" is important.

197. Hibbs,Ben. Reaping the wind. Country Gent.104(5):15,45,48,illus. May 1934. 6 C833
Discusses dust storms of 1933 in southwest Kansas and Oklahoma panhandle.

198. Hill,R. A splendid sand-binding grass. Ehrharta villosa,variety maxima(South African Pyp grass). So.Austral.Dept.Agr.Jour. 32(6):512-513. Jan.15,1929. 23 So84
This grass which was introduced into South Australia is growing on the coastal sandhills at the Minda Home,at Brighton and is said to be holding the sand exceptionally well.

199. Hockley,H.A.and Walker,H.,jr. State action in 1937 for erosion control. U.S.Bur.Agr.Econ.Land Policy Cir.,Apr.1938,pages 8-9. 1.95 L22
Lists states in which soil conservation district laws and wind erosion acts were enacted during 1937.

200. Holding the farm down to earth. Orange Judd Farmer 65(11):205, 212,illus. Sept.14,1918. 6 Orl
Discusses method used in Kankokee co.,Ill.,to prevent blowing and to build up the sandy soil.

201. Hood,G.W. Windbreaks help control erosion in the Great Plains. Soil Conserv.3(10):247-249,254,257,illus. Apr.1938. 1.6 So3S

202. Hopfen,J. Wind erosion and means of control. Internatl.Inst. Agr.Monthly Bul.Agr.Sci.and Pract.29(6):219-223. June 1938. 241 In82
Review of wind erosion control practices in the United States,Australia and the U.S.S.R.

203. Hopkins,E.S.and Barnes,S. Crop rotations and soil management for the prairie provinces. Canada Dept.Agr.Bul.n.s. no.98: 49-52. Ottawa, n.d. 7 C16B n.s.no.98
Soil drifting.

204. Hopkins,E.S.,Palmer,A.E.and Chepil,W.S. Soil drifting control in the prairie provinces. Canada Dept.Agr.Farmers'Bul.32 (2d.rev.) 51pp.,illus. Ottawa,May 1937. 7 C16F no.32 2d rev.
"The following methods have been found to be most successful in controlling soil drifting... (a)Strip farming...(b)Surface cultivation...(c)Cover crops..."

205. Hopkins,E.S. Soil drifting in Canada. Internatl.Cong.Soil Sci. Trans.(1935)3d,v.1:403-405. 56.09 In843 3d,1935.
Drought and high wind velocity are the main causes of drifting.Alternate strips of grain and summer fallow and cover crops are the control measures recommended.

206. Hubbard,C.E. Sand-binding grasses in the Falkland Islands. Kew Roy.Bot.Gard.Bul.Misc.Inform. no.4,page 274. 1937. 451 K51B
Ammophila arenaria,Elymus arenarious.

207. Hunter,Bryon. Dry-farming methods and practices in wheat growing in the Columbia and Snake River basins. U.S.Dept.Agr.Farmers Bul.1545:14-17,illus. Washington,U.S.Govt.print.off.,1927. 1 Ag84F no.1545
Prevention of soil blowing in the northwest.

208. Introduction of plants to prevent soil erosion. Science n.s. 82(2128):344-345. Oct.11,1935. 470 Sci2
The U.S.Department of Agriculture carried on a two-year search for grasses and other plants that will resist drought

in the Great Plains and is testing hardy varieties from Asia. At Tucson various introduced species are promising for sand binding, lawns and forage production.

209. Iyer, V.S. Sand-binding plants. Indian Forester 35(2):82-97. Feb.1909. 99.8 In2

210. Jardine, W.M. Management of soils to prevent blowing. Amer.Soc. Agron.Jour.5(4):213-217, illus. Oct./Dec.1913. 4 Am34P
"Soil of the Great Plains area can be held in place even during the most severe windstorms, by the use of the lister in extreme cases, and ordinarily by the use of adapted tillage implements."

211. Jeffers, Leroy. Sand dunes and the sea. Dun's Internatl.Rev.48(4): 56-58, illus. Dec.1926.

212. Joel, A.H. Soil conservation reconnaissance survey of the southern Great Plains wind-erosion area. U.S.Dept.Agr.Tech.Bul.556. 68pp., illus. Washington, U.S.Govt.print.off., 1937.
1 Ag84Te no.556
"The purpose of this survey was to analyze and evaluate erosion conditions in this representative wind-erosion area."

213. Jones, Ewing. Dust storms through the years. Land Today and Tomorrow 2(4):1-4. Apr.1935. 1.96 Ad6L
Dust storms in the Middle West and their relation to erosion.

214. Jornadas agronomicas y veterinarias, 1937. 413pp. Buenos Aires, 1938. 9 J82 1937
Partial contents: Plantas psammofilas indigenas que pueden ser cultivadas para consolidar dunas. (Indigenous psammophytes which may be cultivated for the consolidation of dunes) by L. R.Parodi, pp.311-321.
"The author has studied the Argentine sand dune vegetation in situ and also in the botanic garden of the Faculty of Agricultural Botany, Buenos Aires (in plots simulating sand dune conditions) and at the Dune Nursery, Mirimar, in comparison with introduced exotic psammophytes. Two lists enumerate (1) the native species of most importance as sand-binders, and (2) those which may be grown in association with the former. The first list comprises the grasses Sporobolus rigens, Panicum racemosum, P. Urivalleanum, Spartina ciliata, Poa (Dioicopoa) Barrosiana and Poa (Dioicopoa) lanuginosa, and in addition Plazia argentea (belonging to the Compositae) and the legume Adesmia incana. Brief botanical descriptions and notes on distribution and cultivation are appended in each case. The second list names thirty-one species and includes many grasses and the legume Trifolium polymorfum (creeping) Lathyrus tomentosus (caespitose) and Lupinus multiflorus (an annual). The last-named species would be of great value in improving sandy soils, always poor in nitrogen organic matter. Further trial may necessitate the transference of some of the second list species to the first list of more important s pecies. - G.M.R. in Herbage Abst.9(1): 67. Mar.1939.

215. Judd,C.S. Aeolian erosion in Hawaii. Amer.Forestry 23(280):239-240,illus. Apr.1917. 99.8 F762
The island of Kahoolawe in the Hawaiian group is an illustration of the damage done by goats and sheep and wind.Overgrazing exposed unprotected soil to the full force of the constant trade winds.

216. Kansas.Legislative council. Research dept. Soil drifting. Preliminary report submitting the texts and some analysis of three proposals for remedial legislation. Kans.Leg.Council. Res.Dept.Pub.43. 66 numb.l. Topeka,1936. 56.7 K13 no.43
Soil drifting problem in Kansas and possible legislation: pt.1,Actual text of bills:pt.2.

217. Kansas.State board of agriculture. Soil erosion by wind in Kansas. Kans.State Bd.Agr.Rpt.v.56,no.224-A. 86pp.,illus. Topeka, 1938. 2 K13Re
Contents:Soil blowing in Kansas and methods of control,by R.I.Throckmorton and L.L.Compton,pp.7-44;The Kansas soil drifting law,pp.45-47;Surveys of soil blowing,by W.A.Atchison,pp.50-86.

218. Keast,A.J. Saving soil at Broken Hill. Rotarian 55(1):27-29, illus. July 1939.
What three men did to stop soil blowing near Broken Hill, Australia and thereby contributed toward saving the central portion of the Australian Continent from becoming the man-made desert that it has threatened to become because of wind erosion and overstocking.

219. Keet,J.D.M. Report on drift sands in South Africa. So.Africa Dept.Agr.and Forestry Bul.172. 44pp.,illus. Pretoria,1936. 24 So84P
Deals with the drift-sand menace on the coast of the south-western districts of the union of South Africa.
Appendix "C",pp.32-34 includes notes on methods employed in fixing drift sand.

220. Keet,J.D.M. Soil erosion and allied problems in South Africa. 18pp. Pretoria,1935. 56.7 K25
References:p.18.
Reclamation of drift sands:pp.10-11.
Origin of drift sands in South Africa:pp.11-12.
Principles underlying the reclamation of drift sand:pp.12-14.

221. Keet,J.D.M. Tree planting in Orange Free State,Griqualand west, Bechuanaland and Northeastern districts of the Cape Province. So.Africa Dept.Forestry Bul.24. 115pp.,illus. Pretoria, Govt.printer,1929. 99:9 So84 no.24.
Reclamation of sand-drifts:pp.42-46.

222. Kelley,A.P. Dune formation by Pine Barren plants. Bot.Gaz.83(1): 89-93,illus. Mar.1927. 450 B652
"Literature cited,"p.93.

223. Kellogg,C.E. Soil blowing and dust storms. U.S.Dept.Agr.Misc. Pub.221. 11pp.,illus. Washington,U.S.Govt.print.off.,1935. 1 Ag84M no.221

"Fundamental responsibility for the great dust storm of 1934 rests with the drought...Drought conditions encourage soil blowing in two ways:(1)Under such conditions the soil is likely to be more loose and pulverized,and (2)the normal protective covering of vegetation,especially of the cereal grains is retarded or even prevented from growth...

"By taking advantage of known facts,the use of land in this general region ordinarily subject to soil blowing can be so arranged that those soils most likely to blow may be devoted to pasture and sod crops without greatly influencing the total percentage of the various crops..."

224. Kellogg,F.B. Sand dune reclamation on the coast of northern California and southern Oregon. Soc.Amer.Foresters Proc.10: 41-64. Jan.1915. 99.9 So13

"An account of methods employed in sand dune reclamation as carried out on an extensive scale for over 15 years near the Oregon line in California,with special reference to the application of the methods in similar sand dune areas situated on the Siuslaw National Forest,Oregon... Abst. - Expt. Sta.Rec.33(8):738. Dec.1915.

225. Kessell,S.L. The Landes of Gascony:a trip through the forest of Mimizan. Austral.Forestry Jour.9(4):105-110. Apr.15,1926. 99.8 Au7

Discussion of the Landes of Gascony showing what can be done to reclaim and render fruitful a naturally sterile area of land.

226. Kimmel,R.I. The future of the dust bowl. Amer.Wildlife 27(3): 51,62. May/June 1938. 412.9 Am32

From an American Wildlife Institute radio broadcast.

227. Kimmel,R.I. A long view of the wind-erosion problem. Kans. State Bd.Agr.Rpt...for the quarter ending Mar.1938:84-94. 2 K13Re 1938

Discusses causes of the erosion problem in the southern great plains,the adoption of conservation practices,the use of available data,and the tasks ahead.

228. King,Arthur. Wind erosion and dust storms in Oregon. Commonwealth Rev.20(1):400-405. Mar.1938.

Description of storms and their damage;suggested control through use of crop residues as a soil protection;and passage of a law by the 1937 Oregon legislature which makes it possible for the people of Morrow County to force careless farmers within the area to follow farming methods that will effectively control wind erosion.

229. Köhler,Alfred. Ödlandsaufforstungen nach der rabattenpflugmethodde; untersucht fur kiefer auf keifer auf heideboden der Niederlausitz. Tharandter Forstl.Jahr.87(7):567-583. 1936. 99.8 T32
Waste land afforestation by the ridge-plow(Rabatten-Pflug) method:experiments with Scots pine on the heatherlands of Niederlausitz.

230. Koschmieder,H. Staubstürme und staubwände. Naturwissenschaften 27(8):113-122. Feb.24,1939. 474 N214
"The author defines the terms,presents(with copious classified bibliography)the geographic distribution of duststorms,summarizes data on duststorms in the United States,the Sudan,the Sahara, Syria,Palestine,Mesopotamia,Iran,and Australia,and finally discusses warm and cold air duststorms and dust walls in general. Abst, - Expt.Sta.Rec.81(4):476. Oct.1939.

231. Kroodsma,R.F. The permanent fixation of sand dunes in Michigan. Jour.Forestry 35(4):365-371,illus. Apr.1937. 99.8 F768
"Describes in detail the methods and costs of fixing moving sand dunes."

232. Kylie,H.R. Planting the Nebraska sand hills. World Agr.5(2):381, illus. Jan.1925.

233. Lamb,G.N. Willows:their growth,use,and importance. U.S.Dept.Agr. Bul.316. 52pp.,illus. Washington, Govt.print.off.,1915. 1 Ag84B no.316
Willows as a sand binder:pp.41-42.

234. Lamb,H.H. Wind erosion in Scotland. Met.Mag.London.73(872): 209-210. Sept.1938.
Brief report on "unusual devastation on the ploughed and sown land" at Montrose on April 2,1938.

235. Landes of Gascony:A trip through the forests of Mimizan. Austral. Forestry Jour.9(4):105-108,110. Apr.1926. 99.8 Au7

236. Langham,W.H. Fertility losses from high plains soils due to wind erosion. Okla.Panhandle Agr.Expt.Sta.Bul.63. 15pp.,illus. Goodwell,Sept.1937. 100 Ok42 Bul.63
References,p.15
It was found that the principal damage to fertility constituents has occurred in the drifting soils and in individual cases, such as very susceptible shallow soils.
Tables give fertility data.

237. Langham,W.H.,Foster,R.L.,and Daniel,H.A. The amount of dust in the air at plant height during wind storms at Goodwell,Oklahoma, in 1936-1937. Amer.Soc.Agron.Jour.30(2):139-144,illus. Feb.1938. 4 Am34P
"Measurements were made with an impinger tube to determine the amount of dust per cubic foot of air at various times during 29 dust storms of 1938 and 1937 occurring at Goodwell, Oklahoma."

238. Larroquette,Albert. Les Landes de Gascogne & la forêt landaise. Aperçu physique et étude de transformation économique. 404pp. Mont-de-Marson,Impr.Dupeyron,1924. 99.47 L32
The Landes of Gascony and the forest of the Landes.Physical outline and study of economic transformation.

239. László,Bárdió. Tapasztalataim a lengyelországi Hel félszegeten fekvö erdögazdaság homokbuchájnak befásitasarol. Erdeszeti Lapok 75(3):227-234. Mar.1936. 99.8 Er25
My experiences with dune afforestations on the Polish peninsula.
Summary in English.

240. Laver,C.G. Reclamation of drift sands. Farming in So.Africa 11(119):53-57,illus. Feb.1936. 24 So842
Two main grasses,marram-grass(Psamma arenaria)& pypgras (Ehrharta gigantea).

241. Law,A.H. "Dust bowl" comes back. Farm and Ranch 55(4):1,10. Feb.15,1936. 6 T31

242. Le Clair,C.A. Beating the wind on blowy soil.Light lands can be farmed with profit when properly handled. Country Gent. 84(19):10,44,46,illus. May 10,1919. 6 C833

243. Leighton,M.M. Geology of soil drifting on the Great Plains. Sci.Monthly 47(1):22-23,illus. July 1938. 470 Sci23
"1.Dust storms will occur in even a moist climate if broad areas of fine rock material,without vegetative cover,are exposed to the wind...
"2.The general prevalence of a definite soil profile over the Great Plains,and the High Plains,shows that their climate is not too dry for a general vegetative cover to develop if it is permitted to do so...
"3.In the High Plains,and under some conditions of soil and topography on the relatively low plains,the opposing factors are so nearly critically balanced that man must act with intelligence and skill if he is not to lose his greatest resource...
"4.The short climatic cycles probably produced local but not wide-spread wind erosion under virgin conditions."

244. Leone,G. Note illustrative sul rimboschimento e consolidamento di dune mobili in Tripolitania. L'Alpe 13(11):344-351,illus. 1926. 99.8 A17
Explanatory note on the reafforestation and fixing of moving sand-dunes in Tripolitania.

245. Lescuyer,M. Evolution de la végétation dans une dune en voie de fixation.Dunes du Cap Bon en Tunisie. Rev.Agr.de l'Afrique du Nord.33(840-841):572-574,582-587. Sept.6,13,1935. 80 R326
Evolution of the vegetation on a dune in view of fixation. Dunes of Cape Bon in Tunisia.

246. Leslie,P. The planting of the sand dunes at Culbin. Roy.Scot. Arbor.Soc.Trans.29(1):19-28,illus. Jan.1915. 99.9 R81T
Description of the reclamation and afforestation of the Culbin dunes.

247. Lessing,F.C. Five year feed reserves. Capper's Farmer 47(7): 12,27. July 1936. 6 M693
Tells how one farmer in Colorado stored feed for stock in times of plenty against years of want,and at the same time so arranged his cultivation and rotation that soil blowing was prevented.

248. The lister mulcher. Farm Impl.News 59(19):21,illus. Sept.22, 1938. 58.8 F22
Describes a lister or row-crop mulcher devised by a Kansas farmer,Gail Challis,of Russell Springs,Kansas,which employs straw or any other farm refuse.
"The objectives primarily are to conserve moisture and prevent soil blowing."

249. Lobeck,A.K. Geomorphology. 731pp.,illus. New York and London, McGraw-Hill book company,inc.,1939. 331 L78G
Wind:ch.11,pp.367-404. "The work of the wind - Erosional work of the wind - Transportation by the wind - Deposition by the wind.Loess-Erosion features of loess deposits - Important loess deposits of the world - Some economic aspects of wind-blown deposits - Maps illustrating work of the wind"...

250. Lökken,T.O. Epic of the sand downs. Amer.Scandinavian Rev. 15(7):412-419,illus. July 1927.

251. Ludbrook,W.V. Improved strains of lupins,and their possible value in Australia. Jour.Aust.Agr.Sci.4(4):196-198. Dec. 1938. 514 Au725
"Many thousands of acres of lupins,including Lupinis hirsutus, L.pilosus,and L.varius are now more or less naturalized on sandy soils in western Australia,where they are highly valued for the reduction of wind erosion,the addition of nitrogen and humus to soil,and as summer and autumn sheep feed.Lupins are also grown on sandy ridges in parts of the Victorian and South Australian mallee wheat areas,where their use is to reduce wind erosion."

252. Lusk,R.D. The life and death of 470 acres. Sat.Evening Post 211(7):5-6,30-31,34,illus. Aug.13,1938.
A planned campaign for "bringing back" the Karnstrum farm in Beadle County,South Dakota,which was ruined by dust storms by means of strip and contour farming to prevent soil blowing.
A Soil Conservation Service demonstration project has been established in this area near Woolsey,South Dakota.

253. McDonald,Angus. Erosion and its control in Oklahoma territory. U.S.Dept.Agr.Misc.Pub.301. 48pp.,illus. Washington, U.S. Govt.print.off.,1938. 1 Ag84M no.301
"Literature cited,"pp.45-47.
Historical background,wind erosion and its control by use

of vegetation,such as cover crops,including grass,alfalfa,cowpeas and sweet clover;dead covers;windbreaks;mechanical controls;the Campbell system of dry farming;plowing;listing,disking;water erosion,cause and extent;cover crops,Bermuda grass; agronomic and engineering practices;terracing;gully control; and ponds.

254. McDonald,Angus. Erosion by wind and water in Oklahoma. Soil Conserv.2(10):233-235,illus. Apr.1937. 1 So3S

255. McGinnis,B.W. Utilization of crop residues to reduce wind erosion. Land Today and Tomorrow 2(4):12-14,illus. Apr.1935. 1.96 Ad6L

256. McKee,Ronald and Schoth,H.A. Sand dune control in the United States. 5pp.,processed. Washington, U.S.Bur.Plant Indus., 1933. 1.9 P691Sd
Gives areas where drifted sand presents a problem,general means of control;and,lists plants,adapted to each region,suitable for vegetative control.

257. McLarem,John. The reclamation of drifting sand dunes. Forester 5(10):222-223. Oct.1899. 99.8 F762
Deals with reclamation of Golden Gate Park,San Francisco, Calif.

258. McLaughlin,W.T. Planting for topographic control on the Warrenton, Oregon coastal dune area. Northwest Sci.13(2):26-32,illus. May 1939.
Discusses means of obtaining topographic control by correlating the use of vegetation with desired future topography.

259. McLaughlin,W.T.and Dinley,G.R. Sand dune control practices on the Stanfield,Oregon work area. 10pp. Feb.27,1939.
Typewritten copy in Soil Conservation Service Library,Spokane, Wash.

260. Macpherson,A. Reclamation of sand areas. New Zeal.Dept.Agr. Jour.5(4):364-370,illus. Oct.15,1912. 23 N48J
"This article discusses the value and use of several leguminous plants,including alfalfa,as soil binders in the reclamation of sandy lands in New Zealand and presents a report on the experimental planting of alfalfa for this purpose. The results indicated that alfalfa could be grown on the soils in question without the application of inoculated soil or of lime. Abst. - Expt.Sta.Rec.28(3):230. Mar.1913.

261. Madigan,C.T. The Australian sand-ridge deserts. Geog.Rev.26(2): 205-207. Apr.1936. 500 Am35G
A study of the Australian deserts in which the author traces the formation of longitudianal sand-ridges from small beginnings,the ridges growing as insolation and disintegration provides the material.Includes various comparative descriptions, with topographical and vegetational data,of other world deserts.

262. Magnein,M.A. Control and use of little waters in France. Upstream Engin.Conf.,1936,Papers,pages 227-232. Washington, U.S.Govt.print.off.,1937. 1 Ag84H
The following is quoted from page 230."Water is not the only agent of erosion.One must also contend with wind,which, under certain conditions,can bring about the destruction of arable soil by covering it up with sand.This happened in the Landes before works of dune fixation were undertaken by the Forestry Service in 1862 and has been continued ever since. The technique of dune fixation is as follows:at a distance of between 100 to 150 feet from the reach of the highest waves,a seacoast dune is built by means of special fences. The work is continued until a dune 40 or 50 feet above sea level is created.In the shelter of this artificial dune various grasses are planted.A cover of branches is used to stop the wind from displacing the sand which eventually is stabilized naturally by the growing grass."
Excerpts in Soil Conserv.2(6):124-125,130. December 1936.

263. Maiden,J.H. Some remarks on the sand-drift problem. Agr.Gaz. N.S.Wales 11(1):12-18, 12(10):1201-1202. Jan.1900, Oct.1901. 23 N472
Instances of what has been done in New South Wales towards fighting sand-drifts.

264. Maiden,J.H. Spiny rolling grass:a sand-stay,(Spinifex hirsistus, Labill) Agr.Gaz.N.S.Wales 5(12):833-835,illus. Dec.1894. 23 N472
"Its only use,though it is a great one,is as a sandstay."

265. Maits,C.F.,jr. Vermont takes a cue from the dust bowl. Soil Conserv.3(6):146-147,illus. Dec.1937. 1.6 So3S
New England farmers are confronted with the problem of blowing sandy wastes encroaching on their pastureland and long-run methods of control advocated are reforestation and controlled grazing.
"For contemporary control many farmers in the Winooski Valley area are resorting to use of 'wisker' terraces and strongly built fences of tree limbs and brush.The 'wisker' terraces are merely bundles of brush and limbs staked around the contour of the blows to check further drifting."

266. Markley,M.C. Archeology as a tool for use in predicting the permanency of agriculture. Science n.s. 86(2239):492-493. Nov.26,1937. 470 Sci2
The author calls attention to his studies in the extreme southwestern portion of the Great Plains where there are many sites of a lost group of the agricultural Pueblo peoples. He believes that dry farming was practiced on the sandy prairie there,but that abandonment of the sandy land sites was probably caused by the blowing of the soil.He states that "at every site in the sandy lands there was evidence of wind-disturbed soil".Similar types of wind erosion are to be seen in the vicinity as the result of twentieth century mis-farming

practices.Thus,according to the writer,"archeological findings are in quite close accord with the present trends of agriculture...giving some confirmation to the theory...that archeology can assist in predicting the permanency of agriculture in many regions".

267. Markley,M.C. The problem of wind erosion. Northwest.Miller 189: 15,24. Mar.31,1937. 298.8 N81

268. Marsh,G.P. The earth as modified by human action;a last revision of "Man and Nature". 629pp. New York,C.Scribner's sons, 1885. 331 M35E
The sands:ch.5,pp.525-583. Deals with nature and distribution of sand dunes.

269. Martin,R.J. Dust storms of January-April 1937 in the United States. U.S.Monthly Weather Rev.65(4):151-152. Apr.1937. 1 W37M
Contains extracts from a letter describing a trip through a portion of the Dust Bowl.
"Severe erosion occurred in some southeastern districts of Colorado during February 1937 and most wheat,and even buffalo grass,suffered."

270. Martin,R.J. Dust storms of May 1936 in the United States. U.S.Monthly Weather Rev.64(5):176. May 1936. 1 W37M
Notes areas experiencing light,dense,and severe duststorms during month of May,1936.

271. Martin,R.J. Duststorms of 1938 in the United States. U.S. Monthly Weather Rev.67(1):12-15. Jan.1939. 1 W37M

272. Mattice,W.A. Dust storms. U.S.Monthly Weather Rev.63(3):113-115,illus. Mar.1935. 1 W37M

273. Mattice,W.A. Dust storms,November 1933 to May 1934. U.S. Monthly Weather Rev.63(2):53-55,illus. Feb.1935. 1 W37M

274. Melles,A.B. Sand dune planting with special reference to the Belgian coast. Gard.Chron.(ser.3)88(2288):364-365,illus. Nov.1,1930. 80 G162

275. Miège,Emile, La fixation des dunes au Maroc. Soc.Bot.de France Bul.68:668-673. Mar./Apr.1921. 451 F84B
The method used to fix the sands:
1.Covering the sands.
2.Sowing seeds at the same time.
3.Eventually planting trees.

276. Millar,C.E. Soils and soil management. 477pp.,illus. Minneapolis,Minn.,Webb Book Publishing company,1930. 56.7 M613
Controlling soil blowing:ch.15,pp.264-276.

277. Mira,Francisco. Las dunas de Guardamar. España Forestal 14(158/159-161/162):81-83,113-115,146-147; 15(165):12-14. June/July, Aug.,Sept./Oct.1929,Jan.1930. 1.9 F76Tr no.154
The dunes of Guardamar.
Translated from the Spanish by C.P. de Blumenthal,U.S.Forest Service,Division of Silvics. Translation 154.
Describes work at the mouth of the Segura River in the province of Aliconte along the coast of the Mediterranean which has two objectives:first,to keep in place the sand thrown out by the sea;second,to have the sands now existing fixed so as to prevent their invading cultivated land,in time transforming the sandy area into a productive one.

278. Molineaux,A. Marram grass. Jour.Agr.Indus.So.Austral.5(7):604-607. 1902. 23 So84
This article discusses results obtained with marram grass as a soil binder.

279. Moller,P.H. Soil control methods. Mont.Farmer 20(10):5. Jan. 15,1933. 6 M764
In Roosevelt co.,Mont.,this farmer never plows a piece of ground oftener than every other year and uses the strip farming method to control soil blowing.

280. Monro,D. The planting of sand dunes at Holkham. Quart.Jour. Forestry 2(2):103-108. Apr.1908. 99.8 Q2
Progress since 1843 towards afforestation as a natural sequence along the coast near Norfolk,England on the Earl of Leicester's estate is considered "one of the best examples".
Here it was found that the Corsican pine is the species which grows best.

281. Montgomery,G.A. How dust storms start. Capper's Farmer 48(12): 9,illus. Dec.1937. 6 M693
Cause of and care for North Dakota dust storms.A system of plowless fallow is recommended.

282. Moone,M.L.and Hodge,F.J. Wind erosion control in Michigan. U.S. Soil Conserv.Serv.Reg.3,Cir.151. 2 numb.l. Dayton,Ohio, June 7,1939. 1.9603 R26 Cir.151

283. Moran,C. Wind defying grasses:U.S.Government scouts search world for plants that have conquered an unfavorable environment and find varieties that promise substantial aid to prairie states farmers. Capper's Farmer 47(3):18,79. Mar.1936. 6 M693
Contains descriptions of exotic plants from many countries, with notes on experimental plantings in the plains regions.

284. Morgan,G.W. Strip cropping to stop blowing. Mont.Farmer 20(12): 3,15. Feb.15,1933. 6 M764
"It would seem that strip cropping could be used to advantage in certain sections of the plains part of Montana where summer fallow is used as a preparation for small grains and feed crops."

285. Morrill,W.J. Fixation of the dunes on the coast of Jutland. Forestry Quart.9:62-67. Mar.1911. 99.8 F768
In 1792 the first experiments were undertaken by the government to curb the sand dunes.Gives an historical development of the control of the problem.

286. Moss,H.C. Some field and laboratory studies of soil drifting in Saskatchewan. Sci.Agr.15(10):665-679,illus. June 1935. 7 Sci2
"It has been shown that the problem of drifting on the light soils is a serious one from many aspects.However,the need for measures of effective control of drifting on the heavier,more fertile soils is equally important,since such soils have a higher potential productivity than the lighter types and the losses incurred through drifting are consequently greater.The necessity of considering soil type in any investigations dealing with soil drifting is evident."

287. Müller,R. Die aufforstung der wanderdünen in der oberförsterei Grünhaus und ihre erfolge. Ztschr.f.Forst u.Jagdw.59(10): 577-602. 1927. 99.8 Z3
The afforestation of shifting dunes in the forest range of Grünhaus and its results.
"The dune area on the Further Pomeranian coast between the Liebelose and the Rega owes its origin to the complete removal of the forest from the original Moor terrain during the 30 years' war.Artificial reforestation was first attempted in 1788, but systematic planting was not done until 1835-42...Heather and mountain pine(P.montana)are the pioneers in local dune culture.Strand grasses have been found useless." Abst. - Biol. Abst.Feb.1930,no.5515.

288. Munger,T.T. Planting experiments on the sand-dunes of the Oregon coast. Jour.Forestry 15(8):1007-1009. Dec.1917. 99.8 F768
Afforestation,except in the very best of the sand-waste country,will not be possible until an herbaceous cover has been established to stop sand movement.

289. Musgrave,G.W. Field research offers significant new findings. Soil Conserv.3(8):210-214,illus. Feb.1938. 1.6 So3S
Soil and Water Conservation Section experiments have revealed that "close vegetation reduces rate of run-off;crops with large,dense foliage intercept rainfall;and organic matter increases the permeability of most soils to water.
"Bermuda grass channel linings are extremely resistant to high velocities of flow...Near Dalhart,Texas,in the reclamation of mounting dunes the force of wind is utilized to level dune crests and redistribute the sand on the eroded land.The effect of wind jets was produced first by the setting on end of gunny sacks filled with sand at short intervals along the crest of dunes and then by gouging wind channels in the partially leveled dune areas.The spreading sand was caught in lister rows and stabilized by suitable vegetation."

290. När flygsanden bindes;skogsodling under svåra förhållanden. Skogen 22(22):449-451. Nov.15,1935. 99.8 Sk51
When driftsands pack;forest seeding and planting under great difficulties.

291. Nelson,A.L. Soil erosion - Archer field station. Wyo.Agr. Expt.Sta.Bul.208. 35pp.,illus. Laramie,Oct.1935. 100 W99 Bul.208
"Soil blowing takes place in damaging amounts,but,with a degree of care adapted to practical operations,most of the productive soils can be farmed without undue damage by soil blowing.
"The greatest danger from soil blowing occurs on fallow land,generally seeded to winter wheat and on row-cropped land,especially if sandy.
"Factors that aid in the control of soil blowing are shallow tillage of a nature that produces clods and leaves the organic matter at the surface,ridging the soil at right angles to the prevailing shelter belts or windbreaks."

292. Newport,F.C.and Hinde,R.R. Farming level terraces in the dust bowl. Soil Conserv.4(5):115-118,illus. Nov.1938. 1 So3S

293. Newton,R. Controlling soil blowing."Strip farming"and other cropping methods prove effective in Alberta. Mont.Farmer 19(24):3. Aug.15,1932. 6 M764

294. Nielsen,Niels. Landskabet syd-øst for hofsjökull i det indre Island. Geog.Tidsskr.31(1):23-44. Mar.1928.
Wind erosion reaches its greatest intensity in the interior and here the most intensive deserts are found.

295. O'Brien,M.P.and Rindlaub,B.D. The transportation of sand by wind. Civ.Engin.6(5):325-327. May 1936. 290.8 C49
Describes experiments to discover the relationship between wind velocity and weight of sand transported.Graphs show typical sieve analyses of beach sands at the mouth of the Columbia river,wind velocity gradients during typical runs, and relating between wind velocity and rate of sand movement.
Illustrations show types of sand traps used.

296. Olsson-Seffer,Pehr. Genesis and development of sand formations on marine coasts. Augustana Libr.Pubs.No.7. 183pp.,illus. Rock Island,Ill.,1910. 500 R59 no.7

297. Palestine sand-dune reclamation. Forest Worker 4(3):22. May 1928. 1 F76Fr
The Acre-Haifa Forest Experiment station of the Palestine Government began sand-dune reclamation investigations in 1921. Brushwood was used successfully on the fore dune.Ammophila grass was planted.Interior dunes were planted with Ammophila, supplemented with Artemesia monopherma.Tests were made with various tree species which are listed.

298. Palmer,A.E. Control of soil drifting. Regina,Saskatchewan World's Grain Exhib.and Conf.Proc.(1933)v.1:442-449. 59.9 W89 1933
Soil drifting is one of the major agronomic difficulties of the open prairies.Discusses emergency measures to use when soil starts blowing and preventive measures such as: crop rotations,windbreaks,cover crops,and strip farming.

299. Palmer,A.E. Soil drifting problem in the prairie provinces. Sci.Agr.16(5):264-265. Jan.1936. 7 Sci2
"In solving the soil drifting problem,then,one of the first requisites is to determine the soil types and to remove some areas from cultivation as soon as possible;the widespread application of the best practices so far developed should be stimulated by a proper extension programme;the attention of investigators should be centered principally on developing control methods for the more difficult soils,especially clay."

300. Pammell,L.H. Soil binding grasses. Iowa Agr.Expt.Sta.Bul.83: 417-421. Ames,July 1905. 100 109 Bul.83

301. Pardé,L. Excursions forestières dans la région de Bruges,en Belgique. Rev.des Eaux et Forêts 74(2):117-128. Feb.1936. 99.8 R322
A forestry tour in the Bruges district,Belgium;including an account of the afforestation of the sand dunes.

302. Perkins,Ralph. Relief work in a dust bowl country.A socio-economic survey. Sociol.and Social Res.23(6):539-545. July/Aug.1939. 280.8 Sol5
"Socio-economic study of Gray County,Kansas."

303. Perrin,H. La fixation des dunes maritimes en France. Ann.École Eaux et Forêts et Sta.Rech.et Expt.2(1):231-254. 1928. 99.9 F845
Fixation of maritime dunes in France.
"Methods employed in fixation of the littoral dunes,and the management of the forests inside the dunes are described.In the Gironde,a good stand of maritime pine yields during a 60-yr.rotation a bout 300 cu.m.of wood per ha(2/3 of it in thinnings)and 12,000-15,000 liters of resin.In the Landes the trees are more widely spaced so that less wood but more resin is produced." Abst. - Biol.Abst.Jan.1930,no.1946.

304. Perry,D.H. Notes on the fixation of shifting sand dunes. Austral.Forestry Jour.10(1):17-19,illus. Jan.1927. 99.8 Au7
Summary of Western Australia's experience in sand dune fixation.

305. Perry,D.H. Some notes on coastal sand drift fixation in Western Australia. Austral.Forestry 1(2):33-36. Dec.1936. 99.8 Au74
The south-west coastal region is particularly liable to erosion

by wind.Satisfactory fixation of the dunes was effected by the systematic planting of Marram grass(Ammophila arenaria).

306. Perry,G.S. Forestry in Sweden and adjacent lands from the viewpoint of an American forester. 276pp.,illus. York,Pa., The Author,1929. 99.66 P42
Sand dune control and heath land planting:ch.11,pp.212-221.

307. Petrie,Flinders. Control of dunes. Nature 135(3421):877. May 25,1935. 472 N21
Sand dunes in the southeast corner of the Mediterranean basin are smothering more and more of a fertile border of Sinai and Palestine.A belt three palms wide,about 80 ft., will entirely arrest dune advance.

308. Petrus. Skogen återerövrar det magra Skåne. Skogen 26(1):3-6, illus. Jan.1939. 99.8 Sk51
Afforestation in Skane.
Reclamation of poor,sandy land and its protection from drifting sand.

309. Phipps,R.W.. Dunes of Gascony. Ontario Bur.Forestry Rpt.1887/88: 37-43. 1888. 99.8 On8 1887/88
Resume of work done by Fance in Gascony and the economic results.

310. Piche,G.C. Blocking sand dunes with trees. Canad.Forestry Jour.15(6):253-254. June 1919. 99.8 C16
Scotch and white pine,Norway spruce,and a small amount of green ash and elms were used.

311. Pierce,D.W.and Pool,Dorothy. The fauna and flora of the El Segunao dunes. I.General ecology of the dunes. South.Calif.Acad.Sci. Bul.37(3):93-97. Sept./Dec.1938. 500 So8
Discusses plant associations of dunes of the El Segunao area in Los Angeles county,Calif.

312. Plains will grow trees with run-off water. Farmer-Stockman 50(2): 42. Jan.15,1937. 6 Ok45
On the wind erosion control project east of Dalhart,Texas trees are being set in natural sites and in engineered sites where water collects naturally or by diversion of natural run-off.

313. Ploughe,J.S. Out of the dust. Christian Cent.52(21):691-692. May 22,1935.
Discusses the damage to the soil by wind in the dust bowl and the methods of fighting erosion.

314. Pool,R.J. A study of the vegetation of the sandhills of Nebraska Minn.Geol.and Nat.Hist.Survey.Minn.Bot.Studies 4(3):189-312, illus. Mar.15,1914. 451 M66
Lists pioneer plants for dune reclamation in Nebraska.States that Redfieldia flexuosa is most important.Fire and overgrazing are given as causes of soil blowing in this area.

315. Popovici,G. Istoricul ptantalulor de salcâm depe domeniul coroanei Sadova. Rev.Pădurilor 48(7/8):822-828. 1936. 99.8 R327

History of black locust plantations on drifting sands in the Sadova crown domain.

"The fixation of these sands was first undertaken in 1884 and started on a large scale in 1898.The sands have been entirely stabilized by planting about 3300 ha.,chiefly with Robinia pseudoacacia,with some oak,mulberry and Scotch and Austrian pine.The locust,cut at 15-25 yrs.,yields 150-200 steres per ha.,and now forms the most important source of revenue for the estate." Abst. - Biol.Abst.Feb.1937,no.4314.

316. Pratt,J.H. Investigations of the N.C.Geological and economic survey relating to forestry problems along the North Carolina banks. Elisha Mitchell Sci.Soc.Jour.24(4):125-138. Dec.1908. 500 E14

"The permanent reclamation of the sand waste depends upon two things:(1)Since the source of supply of the sand is inexhaustible,a barrier must be provided near the beach to prevent new supplies of sand which are brought up by the surf from being blown inland.(2)The loose moving sand in the lee of this proposed barrier must be permanently fixed by growing forests."

317. Putney,Bryant. Reconstruction in the dust bowl. Editorial Res. Rpts.2(5):91-108. Aug.3,1937. 280 Ed42

This pamphlet is divided into four parts:1.The new attack on the wind erosion menace,namely the coordinated program of the Department of Agriculture;2.Causes of distress in the dust bowl,such as unregulated settlement of the southern Great Plains, overstocking,land tenure system and soil erosion;3.Proposed methods of reconstruction;4.Progress of federal and state programs,including the federal emergency wind erosion control program and recent state soil conservation districts laws.

318. Ramaley,Francis. Sand-hill vegetation of northeastern Colorado. Ecol.Monog.9(1):1-51,illus. Jan.1939. 410 Ec72

"Literature cited,"pp.50-51.

"Besides recording the different plant communities with their history,this paper includes quadrat and frequency studies, seasonal changes,climatic and edaphic data,and general floristics; it is illustrated with photographs,charts,tables and a topographic map of a typical sand-hill area near Roggen,Colorado."

319. Ratcliffe,F.N. Further observations on soil erosion and sand drift, with special reference to south-western Queensland. Austral. Council Sci.& Indus.Res.Pam.70. 28pp.,illus. Melbourne,1937. 514 Au72P no.70

Soil erosion does not appear to be prevalent in south-western Queensland.Sandhills of this region are characterized by an incomplete plant cover,in good seasons.Evidence that they are essentially stationary,though unstable of surface,is given.

South Australian drifts are markedly sterile.

The problem of the future of pastoral settlement in the arid semi-desert belt of Australia is discussed in general terms.

320. Ratcliffe,F.N. Soil drift in the arid pastoral areas of South Australia. Austral.Council Sci.& Indus.Res.Pam.64. 84pp., illus. Melbourne,1936. 514 Au72P no.64
"References to literature,"p.71.
Investigation was limited to the arid pastoral areas of South Australia which receive an average annual rainfall of less than 10 inches.
The greatest extent of erosion and drift has occurred where stocking has been the direct cause of destruction of the protective plant cover.
The urgent need for readjusting the stocking policy of the arid pastoral country is emphasized.

321. Reid,Tom. Erosion control crops and practices for the nonirrigated farming area of New Mexico. N.Mex.Agr.Col.Ext.Cir.149. 20pp.,illus. State College,Aug.1937. 275.29 N463E no.149
Recommended practices for wind erosion control in New Mexico are contouring,terracing,contour listing and furrowing,contour chiseling,border planting,strip cropping,and pasture contouring.
Recommended crops are sudan grass,forage sorghums,grain sorghums,broomcorn and corn.
Due to more efficient means of erosion control,it is suggested that it is now possible to increase the number of gardens and orchards throughout the area by the concentration,retention and utilization of flood waters by terracing,spreading, diversion dams and flood ditches.

322. Rempel,P.J. The crescentic dunes of the Salton sea and their relation to the vegetation. Ecology 17(3):347-358,illus. July 1936. 410 Ec7
"Literature cited,"p.358.

323. Reynolds,F.S. Prevents soil blowing. West.Farm Life 38(12):7. June 15,1936. 6 R153
Relates experience in planting corn and beans in small strips to keep soil from blowing on non-irrigated farm in Colorado.

324. Richardson,A.H. Forest tree planting. Ontario Dept.Lands and Forests.Bul.1.,Rev. 63pp.,illus. Ottawa,1928.
99.9 On8B no.1 rev.1928
Discusses trees suitable for planting on sandy soils and methods used in planting,with discussion on methods of protecting plantings.

325. Richardson,A.H. Reforestation on shifting sand. Canad.Forestry Mag.16(12):566-567. Dec.1920. 99.8 C16
By reforestation useless soil has been kept from injuring better parts of the farm and a stand of timber has been started which would yield valuable returns.

326. Richardson,A.H. Tree planting on sand;some helpful hints as to profitable line of action. Canad.Forestry Mag.19(4):240-242, illus. Apr.1923. 99.8 C16
Discusses time of planting,different conditions of sand areas,choice of species,handling the planting stock,and the procuring of the material.

327. Riley,J.A. Sandstorms in Texas. U.S.Monthly Weather Rev.59(1): 30-31,illus. Jan.1931. 1 W37M

328. Robinson,C.H. The sand dunes of Indiana. Nature Mag.26(2):81-84,illus. Aug.1935. 409.6 N214
Discusses the blooming plants native to the Dunes region.

329. Robinson,W.O. Brown snowfall in New Hampshire and Vermont. Science n.s. 85(2164):596-697. June 19,1936. 470 Sci2
"...The quantity of plant food elements transferred long distances by dust storms may be considerable."

330. Rolfe,Deelte. Unusual dust storms in Illinois. Geog.Rev.17(2): 324-325. Apr.1927. 500 Am35G
"On June 6 and 7,1926,wind and dust storms of a great deal of intensity and of a nature hitherto unknown in Illinois swept over restricted and scattered areas in the northern part of the state,not only utterly destroying the corn crop in some fields but actually removing great areas of the top soil."

331. Rosencrans,L.N.and Waters,E.J. Wind erosion cuts Michigan apple yields. U.S.Soil Conserv.Serv.Ohio Valley Reg.,Dayton, Ohio Reg.Cir.138. 1 l.,processed. Dayton,Mar.24,1939. 1.96 So39Rc no.138
Chart presents a summary of observations obtained by the Benton Harbor project on two apple orchards on soils having various degrees of erosion.

332. Roth,Julues. Die aufforstungen der ungarischen flugsandgebiete, I,II,and III. Forstwiss.Centbl.60(8-11):377-402,464-487, 523-532. 1916. 1.9 F76Tr no.226
Forestation in the Hungarian dunes.
Translated from the German by A.H.Krappe,U.S.Forest Service, Division of Silvics.Translation 226.
The author has "tried to give as complete a survey as possible of the management of the Hungarian sand forests."

333. Roux,G. Le pin maritime en Basse-Bretagne. Rev.Eaux.et Forêts 76(12):991-996. Dec.1938. 99.8 R322
The maritime pine in Basse-Bretagne.
Fixation of dunes and afforestation of unproductive land.

334. Rowalt,E.M. Anchoring the Clatsop dunes with vegetation. Soil Conserv.2(4):61-63. Oct.1936. 1.6 So3S
Traces steps taken at the SCS project at Warrenton,Oregon

to stop the destructive advance of sands.First,a "fore" dune is built parallel to the coast to break the sweep of the ocean winds;second,dune grass species are planted at 18-inch intervals;third,sod-forming and soil-building vegetation is established;finally,trees and shrubs are planted for further protection.

335. Royal geographical society of Australia,South Australian branch. Proc...v.XXXVI,session 1934-35. 110pp.,illus. Adelaide, Advertiser Newspapers Ltd.,1936. 514 R81
Shifting sands - the growth of the menace to Australia,by A.E.V.Richardson,pp.43-51.

336. Rule,G.K. Crops against the wind in southern Great Plains. U.S. Dept.Agr.Farmers' Bul.1833. 74pp.,illus. Washington, U.S. Govt.print.off.,1939. 1 Ag84F no.1833
Discusses control measures and cures for soil erosion in the area which includes portions of Kansas,Colorado,Oklahoma, Texas and New Mexico.

337. Rule,G.K. Emergency wind-erosion control. U.S.Dept.Agr.Cir.430. 11pp.,illus. Washington, U.S.Govt.print.off.,1937.
1 Ag84C no.430
"A wider use of thoroughly tested water-saving practices will help to insure more successful crops and to control erosion. These water-saving practices include contour tillage,strip cropping,terracing,contour pasture furrowing,and other methods of using rainfall where it will be of most benefit to growing plants."

338. Russell,R.J.and Russell,R.D. Dust storm of April 12,1934,Baton Rouge,La. U.S.Monthly Weather Rev.62(5):162-163. May 1934. 1 W37M

339. Rutherford,D.M. Wind goes to work. Pacific Rural Press 136(8): 162. Aug.20,1938. 6 P112
How a San Bernardino county farmer is controlling sand dunes on his property.

340. Ryle,G.B. The coastal sand dunes of South Wales. Quart.Jour. Forestry 26(2):140-157. Apr.1932. 99.8 Q2
"Treatment of inland shifting sands follows on much the same lines as for the littoral dune -- generally it is sufficient to scatter brushwood over the sand on irregular drifts and plant marram under their shelter.Fixation must begin from the windward side.A large stretch and encroaching from the sides each year until fixation is complete up to the summit.The lee-ward side can then be planted up at once."

341. Sabin,D.R. Soil blowing in Wyoming. Wyo.Agr.Col.Ext.Cir.46. 7pp.,illus. Laramie,Mar.,1933. 275.26 W99C no.46
Discusses practices that may lessen soil blowing on lands planted to spring crops,handling bare fields in the winter, and seeding down old fields to perennial grass.

342. Salisbury,E.J. Plants of the sand dune and why they grow there. Nature 141(3575):814-818. May 7,1938. 472 N21
Lists plants and gives their characteristics.

343. Samuelsson,Carl. Några studier över erosions-förcteel-serna på Island. Ymer 45(3/4):339-355. 1925.
Wind erosion is by far the most important form of erosion in Iceland;and the vegetation - free areas here are wind deserts.

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Litteraturverzeichnis,pp.224-230.
(Reprinted from Bul.Geol.Instit.Upsala,v.20)
Study of the effect of winds in the cold and temperate parts of the earth.

345. Sand dunes:how they are reclaimed in Europe and in the United States. Sci.Amer.108(25):581,illus. June 28,1913. 470 Sci25
Fixation in France and the United States.

346. Sanford,F.H. Michigan's shifting sands.Their control and better utilization. Mich.Agr.Expt.Sta.Spec.Bul.79. 31pp. East Lansing,1916. 100 M58S Spec.Bul.79
"This publication deals with the conditions found along the windswept shores of the Great Lakes and inland - wherever there is shifting sand.
"The study developed various facts which,if made use of, will assist owners of sand blows to formulate systems of control peculiar to their individual conditions."

347. Sanford,F.H. Progress in blow sand control. Mich.Agr.Expt. Sta.Quart.Bul.1(3):130-131. East Lansing,Feb.1919. 100 M58S

348. Scherer,G.C. A simple mode of arresting shore erosion. Engin. News 58(26):700,illus. Dec.26,1907. 290.8 En34
Discusses use of sand fences and groines in arresting shore erosion.

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Discusses methods of control such as sand fences,vegetation, grasses,fertilizers,brush barriers,oil,etc.

350. Schultz. Die Halbinsel Hela und die aufforstung ihrer dunen. Deut.Dendrol.Gessell.Mitt.20:82-92. 1911. 99.9 D482
The afforestation of sand dunes on the Hela Peninsula. A descriptive account dealing with sand binding and afforestation on the Hela Peninsula in West Prussia. Abst. - Expt. Sta.Rec.26(6):543. May 1912.

351. Sears,P.B. Deserts on the march. 231pp. Norman,University of Oklahoma press,1935.
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352. Sears,P.B. O,bury me not or,The bison avenged. New Repub.91(1171): 7-10. May 12,1937. 280.8 N
Author discusses the condition of the high plains or short grass country,where the "Dust Bowl" has its center,and the need for immediate intelligent action in this region.
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353. Shepherd,Frederick. The story of the dunes. Rocks and Min.7(2): 41-48,illus. June 1932.
Indiana sand dunes.

354. Shinn,C.H. An economic study of acacias. U.S.Dept.Agr.Bul.9. 38pp. Washington, U.S.Govt.print.off.,1913. 1 Ag84B no.9
Acacias for sand-dune reclamation:pp.9-15.
"The acacias have great value as a ground cover,for dunes near the ocean,and for inland sand barrens,almost to barren conditions,since they will thrive with only a few inches of rainfall,provided it comes at such a time when the seeds can become rooted,and provided the temperature does not fall below 20° F."

355. Sidwell,Raymond. Sand and dust storms in vicinity of Lubbock, Texas. Econ.Geog.14(1):98-102,illus. Jan.1938. 278.8 Ec7
Observation of the storms in the spring of 1935 and 1936 furnishes information as to the texture and mineral content of the material carried by the wind;general weather conditions; the effect of the sandstorms on general health conditions;and effects of the storms on growing vegetation.

356. Silcox,F.A. Green belts in drouth areas. Nation's Agr.14(7): 4,15,illus. July/Aug.1939. 280.82 B89
"The land in the Dakotas,Nebraska,Kansas,Oklahoma,and the Texas Panhandle is wind-bitten land,but it responds to treatment which reduces the wind movement and accordingly,the hazard to crops,soil,livestock and human beings.Results already obtained with shelterbelts indicate that such tree shelter for crops and soils should play an important part in any permanent system of prairie agriculture."

357. Simons,H.F. Junked car bodies protect pipe line. Oil and Gas Jour.37(39):35,illus. Feb.9,1939.
In Kiowa county,Kansas junked car bodies and highway fences are being used to protect the 24-inch gas lines from wind erosion.It is said that "sand dunes in this section cause whirling currents which sometimes erode the sand to depths from 10 to 12 feet.Much of the protective soil covering was blown from the gas line and maintenance crews were kept busy sounding the line and back-filling where the cover was not sufficient."

358. Sloan,Sam. Soil blowing and its control. Mont.Farmer 21(22):5. July 15,1934. 6 M764
Discusses methods of controlling soil blowing.Lists advantages and disadvantages of strip farming.

359. Smith,D.E. Dust devils and dessication in West Africa. Met.Mag. London,72(856):83-85. May 1937.
"The dry harmattan from the Sahara is annually bringing a considerable amount of fine dust or sand into the West Africa colonies.The harmattan blows nearly half the year...It is only in the north amongst the large sandy tracts of Northern Nigeria and French West Africa that we have the incubation grounds of sand storms and dust devils."

360. Smith,J.M. Tillage...and soil drifting.How tillage implements influence soil drifting on Alberta farms. Mont.Farmer 19(22): 3. July 15,1932. 6 M764

361. Smith,S.D. Forestation a success in the sand hills of Nebraska. Soc.Amer.Foresters Proc.9(3):388-395,illus. July 1914. 99.9 So13
A review of reforestation work in the sand hills of the Nebraska National Forest.

362. Smith,Wyman. Trees stop drifting dollars. Successful Farming 35(4):26,97-98,illus. Apr.1937. 6 Su12

363. Snow,L.M. Progressive and retrogressive changes in the plant association of the Delaware coast. Bot.Gaz.55(1):45-55,illus. Jan.1913. 450 B652
Points out that a long period of time is required to notice associational changes even on an active dune.

364. Soil conservation rebuilds blown field. West.Farm Life 39(23):5, illus. Dec.1,1937. 6 R153
Through the use of soil and moisture conservation practices, a Colorado farmer stabilized his field against blowing and produced 25 bushels of grain sorghum to the acre in 1937.

365. The soil drift problem.Forage plants in the wheat belt. "Commonwealth" Agr.9(3):101-105,illus. Apr.1939. 23 C73
Mentions experimental research in Australia "to determine whether there are forage plants which can be used in cropping rotations to increase stock carrying capacity on the one hand and,on the other,to build up soil fertility,prevent erosion, and eliminate soil drift".

366. Soil research. Science n.s. 87(2252):8 (Sup.) Feb.25,1938. 470 Sci2
Quotes from remarks of J.L.Doughty,senior soil specialist, relative to soil erosion studies in progress at the Soil Research Laboratory of the Dominion of Canada Experimental Station,Swift Current,Saskatchewan.
"Patterned after wind tunnels used by aeronautical engineers

the world over,two machines have been set to work to tell erosion specialists exactly how erosion takes place...Data resulting from the study,it is believed,will constitute one of the first exact determinations of the conditions necessary for rapid wind erosion."

367. South Africa.Secretary for agriculture and forestry.Annual report for the year ended 31 August 1938. Farming in So.Africa 13(153):459-591,illus. Dec.1938. 24 So842
Drift-sand control,pp.471-472.

368. South Australia.Soil conservation committee. Report...together with maps and appendices. 58pp.,illus. Adelaide,1938. 56.7 So82
W.J.Spafford,Director of Agriculture,is chairman of the committee which visited all regions in South Australia and then drafted this report on erosion conditions with recommendations for control.
Drift erosion in the agricultural areas:pp.16-23.

369. Spafford,W.J. The control of drifting sand. So.Austral.Dept. Agr.Jour.32(8):700-709. Mar.15,1929. 23 So84
Discusses causes of sand-drifts;farming sand lands to prevent drifts;controlling surface drifts;drift on roadways; how to grow soil-binding plants;and,breakwinds.

370. Spengler,G.C. Ontwerp normaal statuten voor boschvennootschappen tot het opbosschen van pandverstuivingen. Tijdschr.der Nederland.Heidemaatsch.13(2):70-75. 1901. 1.9 F76Tr no.317
Laws for cooperatives engaged in the forestation and fixation of shifting sand.
Translated from the Dutch by Michel Mok. U.S.Forest Service Division of Silvics.Translation 317.

371. Spinden,H.J. Waters flow,winds blow,civilizations die. North Amer.Rev.244(1):53-69. Sept.1937.

372. Starr,A.M. Comparative anatomy of dune plants. Bot.Gaz.54(4): 265-305,illus. Oct.1912. 450 B652
Contributions from the Hull botanical laboratory 161.
Studies made on Michigan dunes.Gives characteristics of a true dune plant as(1)low tufted or bushy with short internodes, (2)leaves small and awl-shaped or long and thick,(3)outer wall of leaf epidermis thick.All factors point toward xerophytism.

373. Steijn,J.A.van. Duin-bebossching. 318pp.,illus. Thesis: Landbouwhoogeschool,Wageningen,1933. 99.47 St3
Afforestation of dunes.
"The history of the afforestation of dunes in Holland and other European states,especially in Gascony,Denmark,and in the 'Frische -'and 'Kurische Nehrung'(Germany,Dantzig)is described.Though local circumstances cause differences,the general principles for controlling sand dunes and their

afforestation are the same...among the climate - and site - factors the 2 most important are water and wind.Their influences on plant and trees and on the soil are described. The withdrawal of groundwater from the dunes for town water-supply has damaged the vegetation in some places.In afforestation in Holland,the soil,if covered with grasses and other plants must be dug over the whole surface or on strips.Experiments were made by adding wet turf to the plants instead of digging the ground.To avoid damage by drift sand marram grass is planted.The most used tree is Pinus nigra austriaca; P.n.corsicana,P.maritima,P.Montana and some other spp.are also planted.The plants are mostly 2 yrs.old.Broad-leaved trees(Betula,Quercus,Acer,Populus,Sobrus,Alnus)are used in valleys on northern slopes and on other favorable sites... J.A.van Steijn. Abst - Biol.Abst.Aug./Sept.1934,no.16319.

374. Stephens,P.H. Why the dust bowl? Jour.Farm Econ.19(3):750-757. Aug.1937. 280.8 J822
The author locates the Dust Bowl and gives historical statistical material on rainfall in this region.He states that farming on the contour has resulted in an increase in the penetration of rainfall.Expensive terraces are not necessary but inexpensive contour farming and strip cropping are sufficient and more practical.

375. Stevenson,E.B. Dunes of the Manistique area. Mich.Acad.Sci. Arts,and Letters Papers 14:475-485. 1931. 500 M582

376. Stoeckeler,J.H. Shelterbelt planting reduces wind erosion damage in western Oklahoma. Amer.Soc.Agron.Jour.30(11):923-931, illus. Nov.1938. 4 Am34P
The writer records his observations of the planting program successfully carried on for over 30 years in northeastern Greer county,Oklahoma,about 15 miles north of Magnum.
Trees planted were cottonwood and mulberry,combined with strip cropping.

377. Stomps,T.J. The dunes of Lake Michigan. Plant World 18(8): 205-216. Aug.1915. 450 P69

378. Strip cropping saves wind damage. Farm and Ranch 53(14):14. July 15,1934. 6 T31
The Department of Agriculture "reports that by proper methods of tillage,by strip farming as used successfully in sections of Montana,and by planning land-use so as to keep these soil types most subject to blowing in sod crops,many experienced and capable farmers are quite effectively controlling this wind erosion on their own lands".

379. Suss,N.I. Dostizheniia v oblasti agrolesomelioratsii. Selsk. Khoz.U.S.S.R.Ezheg.1935,pp.172-183. Moscow,1936. 1.9 F76Tr. no.286
Achievements in the improvement of agricultural lands by forestation.
Translated from the Russian by C.P. de Blumenthal,U.S. Forest Service,Division of Silvics. Translation 286.

380. Talman,C.F. Big and little dust storms. Nature Mag.25(3):103-106,illus. Mar.1935. 409.6 N214
Popular discussion of dust storms in America and elsewhere.

381. Taylor,K.W. Shelterbelts as recreation areas and game refuges. Parks & Recreation 22(7):352-357,illus. Mar.1939. 98.8 P23
A consideration of the field shelterbelts being planted on the plains by the Forest Service to prevent soil blowing and to protect crops from the winds.

382. Teagarden,E.H. Control of wind erosion. Jour.Land and Pub.Util. Econ.13(4):420-421. Nov.1937. 282.8 J82
Summarizes new act passed in 1937 by Kansas Legislature which "declared it to be the duty of the owner of real property to prevent dust blowing therefrom by planting perennial grasses,shrubs,or trees,annual or biennial crops,or by cultivation".

383. Tear,T.J. Sand dune reclamation in Palestine. Empire Forestry Jour.4(1):24-38. 1925; 6(1):85-93,illus. 1927. 99.8 Em72
"Work at two forestry stations established in 1921 near Acre and Gaza in an attempt to control the drifting of sand, which along the Palestine coast has become a constant menace to farms,villages,railway and telegraph lines,etc.has given promise of success.As a primary barrier,brushwood fencing gave the most efficient results,especially when the resultant sand dune was planted with Ammophila arenaria,an indigenous beach grass capable of surviving in spite of drifting sand. In comparing direct sowing with planting of forest trees,the results to date are decidedly in favor of the use of transplants.Fairly promising results were attained by using Acacia spp.on land planted the same season with beach grass,but it is though that the success would have been much greater had the sowing of the forest seed been deferred for one or two years.Of the many forest species tried,Tamarix articulata and Acacia cyanophylla have been the most successful." Abst. - Expt.Sta.Rec.53(9):846. Dec.1925.

384. Tellier,L. The fixation of sand dunes and oasis protection in Tunis. Bul.Agr.de l'Algérie,Tunisie 11(1):9-15. 1905. 24 B87
An account is given of attempts made by the Forest Service of Tunis to hold in check the sand dunes about some of the oases in southern Tunis.

385. Ten Eyck,A.M. Treatment and utilization of flood damaged lands. Kans.Agr.Expt.Sta.Bul.120. 162pp.,illus. Manhattan,Jan. 1904. 100 K13S Bul.120
Discusses treatment of land receiving heavy sand deposits from river floods with sand-binding grasses prior to permanent seedings or recovery of land for agriculture.

386. These boys tackle even the sands of the sea. Oreg.Farmer 60(10): 291,illus. May 3,1937. 6 Or32
Article discusses the methods of controlling shifting sands from the sea which were destroying rich pastures in Clatsop county,Oregon.

387. Thompson,W.O. Original structures of beaches,bars and dunes. Geol.Soc.Amer.Bul.48(6):723-751,illus. June 1,1937. 403 G29
Bibliographical footnotes.

388. Thomson,J.P. The Gearhart-Fort Stevens dune area of the Oregon coast. ms. Spokane, U.S.Soil conserv.serv. 1935.
Copy in Soil Conservation Service Library,Spokane,Wash.

389. Throckmorton,R.I. Dust storms;their cause and suggested remedies. Engin.News-Rec.114(19):669-671,illus. May 9,1935. 290.8 En34
"Drought and inadvisable farming methods have subjected 18,000,000 acres to wind erosion.Although more extensive than previously,current dust storms are not unprecedented in severity.Rain and changed methods of cultivation will save most of the areas."

390. Throckmorton,R.I. Yardstick for wheatgrowers. Country Gent. 106(3):19,109,115,illus. Mar.1936. 6 C833
Gives recognition to importance of moisture studies made by A.L.Hallsted and O.R.Mathews which enable farmers to gauge moisture penetration at seeding time and thereby plan their acreage.
It is indicated that the principles established by the Hallsted-Mathews studies are basic to the proper use of land in the hard red winter-wheat region.Much wind erosion is the result of preparing land and seeding wheat,which according to this newly compiled data was doomed to failure before it was planted.Vast expanses of soil are left bare and exposed,inviting wind erosion,when there should be a protective covering awaiting the coming of sufficient moisture to warrant cultivating and seeding.

391. Throssell,G.L. Soil drift reclamation by means of lupins. West.Austral.Dept.Agr.Jour.14(4):394-400,illus. Dec.1937. 23 W52J
Describes how two cases of soil drift in West Australia were successfully controlled by growing the local blue lupin (Lupinus varius)mixed with cereal crop.

392. Tons of soil shift in recent storm. Farm and Ranch 53(12):12. June 15,1934. 6 T31
Discussion of the dust storm of May 1934.

393. Topley,W. Sand dunes and blowing sand. Pop.Sci.Rev.14(55):33-142. 1875. 472 P81
Describes in detail the sand dunes of England.Discusses those of Europe,Asia and Africa.

394. Toumey,J.W.and Korstian,C.F. Seeding and planting in the practice of forestry. Ed.2,507pp.,illus. New York, J.Wiley & sons, inc.,1931. 99.47 T64 Ed.2
Soil instability:ch.11,pp.224-230.
Discusses kinds of dunes and causes.Gives treatment of dunes necessary for permanent control.Mentions some plants adapted to dune control.

395. Trabut,Louis. Fixation des dunes par une graminée fourragère, le Saccharum biflorum Forsk. Acad.d'Agr.de France. Compt. Rendt.7(12):308-311. Mar.1921. 14 P215Bc
Coastal dunes of l'Oranie.

396. Tronk,F.B. Shelterbelts for windblown soils. Wis.Agr.Col.Ext. Cir.287. 8pp.,illus. Madison,Jan.1938. 275.29 W75C no.287

397. Turner,E.P. Reclamation of sand dunes. New Zeal.Jour.Agr.18(3): 148-150,illus. Mar.20,1919. 23 N48J
"Instructions are given for fixing and afforesting sand dunes under New Zealand conditions,together with a translation of an article by E.D.Van Dissel on the treatment of sand dunes in Holland." Abst. - Expt.Sta.Rec.41(4):343. Sept.1919.

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A review of the experimental work and methods developed to treat the light blow sand along a 4.34 mi.section of the Colorado river aqueduct.

399. Tyler,M.C. Present work of the United States beach erosion board. Shore and Beach.5(1):10-11. Jan.1937.

400. U.S.Engineer dept. Beach erosion board. Manual of procedure in beach erosion studies. 77pp.,illus. Washington, U.S.Govt. print.off.,1939. 152.25 P19 Paper no.2
Places in convenient form the(1)legislation and regulations affecting beach erosion and shore protection studies,(2)procedure to be followed in securing cooperative studies,(3)the field and office work now considered desirable in a beach erosion study,and(4)typical plans of improvement and their applications.

401. U.S.Extension service. Report of conference on wind-erosion control, Amarillo,Texas,January 18 and 19,1936. 5 numb.l.,processed. Washington,1936. 1.9 Ex891R
U.Umberger,chairman,Regional committee.
R.I.Kimmel,chairman,Washington committee.

402. U.S.Soil conservation service. Pacific northwest region,Spokane, Wash. Progress report,Astoria nursery unit. 1938.
Typed copy in Soil Conservation Service Library,Spokane,Wash.
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403. U.S.Soil conservation service. Southern Great Plains region, Amarillo,Tex. Relation of wind erosion to vegetative cover as indicated by engineering measurements on the Dalhart,Texas project. 13 numb.l.,mimeogr. Amarillo,1939. 1.9606 R27
"While conclusions drawn for the data presented here are made with reservations and due regard to the inadequacy of one year's study the trends indicate the value of erosion profile studies for measuring the benefits of soil and water conservation practices in an area subject to severe wind erosion."

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Development of new farm land:1.80.
Protection of farm land from wind erosion:1.80-81.

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Wind erosion:1.31-36.

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By William C.Boatright.
"A soil conservation survey of the Froid demonstration area in Roosevelt county,Mont.,reveals that 9,850 acres,or 31.7 percent of the project,has been damaged by moderate wind erosion.Severe damage has occurred on only 463 acres,or 1.5 percent of the area.Slight erosion has occurred on 18,600 acres.No evidence of accelerated erosion was found on 2,184 acres.Thus,while very little of the land has been seriously damaged by wind erosion,practically the entire area is subject to erosion and is therefore in need of protection."

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409. Upshaw,H.C. Anchored farms on the plains. Seed World 42(9): 12-13,40,illus. Oct.1937. 61.8 Se52
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410. Van Diesel,E.D. Plantations dans les dunes des Pays Bas. New Zeal.Dept.Agr.Jour.18(3):150-154,illus. Mar.20,1919. 23 N48J
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411. Veryard,R.G. Duststorms in India. Met.Mag.,London,73(869): 112-116. June 1938.
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412. Vinall,H.N. Forage crops for the sand-hill section of Nebraska. U.S.Bur.Plant Indus.Cir.80. 23pp.,illus. Washington, U.S. govt.print.off.,1911. 1 P69C no.80

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414. Visher,S.S. Regional contrasts in erosion in Indiana with especial attention to the climatic factor in causation. Geol.Soc.Amer.Bul.48(7):897-929. July 1,1937. 403 G29
Three types of erosion are extensive:sheet erosion,gullying,and wind erosion.

415. Vuren,J.P.J.van. The problem of wind-eroded lands. Farming in So.Africa 12(132):108-109,125,illus. Mar.1937. 24 So842
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416. Walther,Eric. The inspiring story of Golden Gate park. Soil Conserv.2(4):72-73,82-83. Oct.1936. 1.6 So3S
Reclamation of sand dunes and conversion of a part of San Francisco into a park.
"The transformation of this desert into a garden,the long years of experimentation and experience,yield many useful lessons to the soil conservationist."
Plant introduction is stressed.

417. Waterman,W.G. Development of root systems under dune conditions. Bot.Gaz.68(1):22-53,illus. July 1919. 450 B652
Contributions from the Hull botanical laboratory 250.
Sand dune vegetation of Michigan was investigated.Describes root systems of some of major dune plants.It is explained that dunes differ from arid deserts in that mineral salts are practically absent and moisture does not solve the problem of plant growth in dune areas.

418. Watson,W.R. Economic units for the dust bowl. Soil Conserv.4(3): 80-81,88,illus. Sept.1938. 1.6 So3S
Outlines the objectives and some of the results of the cooperative program in the dust bowl and bordering areas carried on by the Soil Conservation Service and the Farm Security Administration.

419. Watt,A.S. Studies in the ecology of Breckland. II.On the origin and development of blow-outs. Jour.Ecol.25(1):91-112,illus. Feb.1937. 450 J829

"In Breckland's vegetational and soil history wind erosion has played and still plays an important part.Broadly two kinds of erosion may be distinguished.The first,demonstrated on any dry windy day in March or early April by the drift of sand from newly tilled field,may be described as frontal:in this type the casual winds blow more or less straight or direct.In the second type the casual winds are cyclonic:the erosion in local and wind-furrow or blow-out is formed (Pl.I,phot.1)"

This article is a discussion of causes and effects of wind-blown sand.It is stated that "no blow-out can be formed where there is a continuous cover of higher plants stabilizing the soil.The opportunity is presented only where degeneration of the plant communities take place."

"No correlation can be observed between the origin of blow-outs and rabbit activity."

420. Watt,A.S. Studies in the ecology of Breckland. III.The origin and development of the Festuco-agrostidetum on eroded sand. Jour.Ecol.26(1):1-37. Feb.1938. 450 J829

References,p.37.

The subject of the paper is the building up of a new vegetation on the raw soil exposed as the result of wind erosion.

421. Weatherwax,H.E. The first national seashore in America.Landscape preservation by the National Park Service. Landscape Architecture 28(1):29-37,illus. Oct.1937. 80 L23

Plans for improvement of the Cape Hatteras National Seashore on the North Carolina banks include erection of brush fences for control of blowing sand and planting of ground-cover for protection against future sand erosion.

It is indicated that formerly this section was heavily wooded with pine,cedar and oak but with the cutting of timber which began sixty years ago the process of erosion has been continuous.Next,cattle grazed the grass over practically the entire section and left the loose sand to be blown about by the wind.

422. Weatherwax,H.E. Protecting North Carolina beaches against wind and wave erosion. Engin.News-Rec.118(9):330. Mar.4,1937. 290.8 En34

Abstract of a paper presented on December 14,1936 before the American Shore and Beach Preservation Association.

Tells of work of N.C.Beach Erosion Control Project on which about 1,000 WPA laborers are employed.

The brush fence was found to be the most effective type for the creation of new sand dunes which could be held in place by planting coverings of grass.

423. Weaver,J.E.and Clements,F.E. Plant ecology. Ed.2,601pp.,illus. New York and London,McGraw-Hill book company,inc.,1938. 463.8 W37P Ed.2
Dunes:pp.74-75,248,250-251,484.
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424. Webster,A.D. Reclaiming sand dunes in Belgium. Gard.Chron. (ser.3)52(1344):243. Sept.28,1912. 80 G162
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425. Wehrwein,G.S. Wind erosion legislation in Texas and Kansas. Jour.Land and Pub.Utility Econ.12(3):312-313. Aug.1936. 282.8 J82
Compares the Texas wind erosion Act,passed May 21,1935,with the soil drifting law passed in Kansas in 1913 which has never been enforced.States that "perhaps the Texas law will be more workable since it follows the irrigation or drainage district principle.It provides means and machinery for financing erosion control instead of relying upon ' compulsions' to be enforced by an elected board of commissioners."

426. Weis,F. Replantninpforsoeg paa et affoegent sande Haarup sandflugt ved Silkeborg. Dan.Expt.Forestry Serv. Koebenhaven 13(2):63-112. 1933. 1.9 F76Tr no.15
Planting experiments in a territory of drift sand.Haarup sand-drift near Silkeborg.
Translated from the Danish by H.Rann. U.S.Forest Service, Division of Silvics.Translation no.15.

427. Wells,B.W. A new forest sub-climax;the salt spray climax of Smith Island,North Carolina. Ecol.Soc.Amer.Bul.19(4):35, art.5. Dec.1938. 410.9 Ec7
Abstract.
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428. What the maritime pine has done for France. Naval Stores Rev. 22(13):16-20,22. June 27,1912. 99.8 N22

429. White,M.B. Dust changes America. Nation 140(3646):597-598. May 22,1935. 110 N
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430. Whitfield,C.J. Crop production on land badly damaged by wind erosion in the Great Plains. Amer.Soc.Agron.Jour.30(6): 461-464,illus. June 1938. 4 Am34P
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432. Whitfield,C.J.and Perrin,J.A. Sand-dune reclamation in the southern Great Plains. U.S.Dept.Agr.Farmers' Bul.1825. 13pp.,illus. Washington, U.S.Govt.print.off.,1939. 1 Ag84F no.1825
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."References,"p.917.
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